The Builder.

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Evolution of the English House.

WHEN Mr. Addy speaks of the "English House" in the book under the above title,* it must not be supposed that his purpose is to throw light upon the genesis of the modern villa. He is alluding to a period prior to building estates, even before the Italian architect of the sixteenth century had set the type in this country of what every nobleman's mansion should be. "The English House" is the house of our forefathers who lived during the Edwards, and into the Wars of the Roses, before merchants grew rich under the patronage of King Henry VII., and began to tire of too simple a mode of life. Such a house as Mr. Addy describes was in itself so elemental a matter, that we had hardly regarded its growth as deserving of so large a title as that which is given to it, especially when treated independently of general social development. The author, however, in addressing himself to structural influences and peculiarities, has afforded some very interesting information, while he assists the reader by means of photographs and plans which illustrate actual examples. These examples, if their date cannot actually be verified, are far more convincing than the form of evidence more usually supplied from ancient manuscripts, wherein legendary dwellings are depicted, which are obviously of a Byzantine and traditional character. Such documentary specimens are valuable thus far, inasmuch as they invariably present us with the basilican form, and it can hardly be doubted that it was the acceptance of such a form by the rude inhabitants of Northern Europe that marks the first advance in dwelling construction. It is not in the accommodation provided by such a plan wherein the advance consists. The plan embraces but a single room, and the proprietor of cave or hut could boast as much. But in fusing itself into the hut style of construction, the basilican idea provided height, by which the health and comfort of the occupants were better met, and even enabled a building of more than one story to become a possibility; moreover, it introduced the *bay* as a constructive element, and, in doing so, it foreshadowed, at least, the more actual subdivision of the plan. Among rude buildings of Germany and in the instance of "Coits," which, as the author explains, are a combination of dwelling-house and cattle-shed to be found in Yorkshire, a more composite basilican plan is evident. The rectangle is broken by a series of posts which form the head of the stalls and against which the partitions butt. A corresponding series on the opposite side produce an effect of nave and aisles. We are unable, however, to follow any development of this arrangement, and would rather confine ourselves to discussing the possibilities of the single chamber. This single chamber, in the most elementary type of habitation, exists alone. As time advances, it gathers smaller chambers round it. Seldom does the whole in any proper sense approximate to a plan—it is still the single chamber with accretions.

We can probably refer to nothing earlier than the circular hut dwellings upon Dartmoor. Remains of these cover the hill sides, and although for the most part they can scarcely be distinguished from the scattered rock, yet in many places, noticeably at Grimspound, their forms are clearly marked by the well-laid stones of their foundations. Hundreds here lie clustered together, the whole surrounded by a defensive wall. These huts measure some eight to ten feet in diameter, and have a portion of the floor paved and raised above the general level of the ground, presumably as a sleeping space. It is impossible to assign any date to these dwellings, since they supply no record in the way of implements or pottery; but the author, in describing what would appear to be a similar village at Glastonbury, is able, from remains of various sorts, to hazard their date at some 200 years B.C. At Glastonbury also may be seen the round and rectangular hut side by side, showing that the difficulties presented by the latter form in the construction of roof and angles had by then been overcome. The materials employed would depend upon the situation. Upon Dartmoor these would necessarily be stone. But where timber was obtainable, the walls were formed of piles and wattles, upon a stone foundation, or a double row of piles with clay between, after the manner of a coffer-dam. Or the walls might be dispensed with, and the roof spring from the underpinning, and this would bring us to the form of construction of which the book gives us an illustration.

Here, too, we notice the introduction of the bay. The forked principals or crutches of the roof spring from the ground and present the appearance of an inverted boat. Lack of head-room towards the sides would, however, take much from the area of the room. To correct this, it would appear that the collars of the forks were prolonged to carry a plate for the feet of the rafters, which would afford the height required, when the vertical space between ground and plate was built up. The distance between any two forks formed a bay, the bay being always 16 ft. or thereabouts. Thus a house was described by the number of bays it contained. The length of a bay was, according to the author, fixed by the space required to accommodate two yolk of oxen. The oxen ploughed four abreast, and four abreast they were stalled. A perch, which was the linear standard of old time (and walling in the country is still measured in perches), was 16 ft., and land was thus measured by the span of oxen employed in ploughing it. A house might boast of several bays, but it was still a single room, or, if it were to possess another chamber, a further bay was added with a partition wall, or a lean-to, or "outshott" was placed against one of the ends. Thus a house of any importance, a manor or grange, would probably consist of the hall, with a store or stabling beneath one bay, and over the stabling a chamber or "bower" for

* "The Evolution of the English House." By Sidney Oldall Addy, M.A. London: Swan Sonnenschein & Co.

the women-folk, and another, the "solar" for the thane or master, approached by an outside stair, the hall being used by night as the sleeping apartment of the servants. The buttery or kitchen would occupy an outshot. The hall was also known as the "house-part" or "fire-house." The latter term suggests the importance with which the means of warming the house was necessarily regarded. It cannot be doubted that the whole arrangement of the accommodation turned upon this, and the difficulties presented are, we think, responsible largely for the slow development of house planning. The fireplace and flue constructed against and in the wall could have been but little in use before the fifteenth century; and the latter, often formed of plaster and timber, brought the danger of the total destruction of the house within measurable distance.

"Antiently before the Reformation," says an old writer, "ordinary men's houses, as copyholders and the like, had no chimneys, but flues like louver holes, some of them being in when I was a boy." Another declares that in the memory of the old men who lived in his village, there were not above two chimneys "in most uplandish towns. . . . Each one made his fire against a reredosse in the hall, where he dressed his meat." Mr. Addy thinks reredos to have been "a canopy made of wood and plaster which so often stood over the open fire-hearth and received the smoke," but we have generally seen it described as the hearth itself.

The fire so laid in the centre of the hall was the only safe method; yet the inconvenience occasioned by this, except in a room of very large size, must have been intolerable by reason of smoke, draught, or both. Thus it is likely that the inns were frequented by the poorer people in search of warmth, and the name of "cold-harbour," which is often met with, may refer to such use. It was only with a general improvement in building materials that houses of any pretensions were possible, and the modern house may be said to date from the invention of properly-constructed flues and fireplaces. That the "fire-house" should reach from floor to roof would seem to have been a structural necessity, that the smoke might find means for dissipation. With improved arrangements the two-storied plan became general.

The builders of the English house had no precedent to go on. The Roman warmed his house by a hypocaust, a method presumably too intricate for our forefathers. But when the problem had been solved, probably by the Italian architects who flocked over here in Henry VII.'s time, we get the great English houses like Longleat, Hengrave Hall, Hatfield, and Penshurst. As to the materials of which houses were built, it was necessarily a local matter. They were for the most part entirely of timber, which made their improvement difficult. The spaces between the quarters were filled with cob, a mixture of earth and straw, or with lath and plaster. Plaster of Paris was largely employed in the thirteenth century. Bricks did not come into use until the fourteenth century, and could then have been only locally obtainable. But cob was exceedingly durable so long as the weather was kept out of it, and was constructed in layers or sections, with the straw put transversely and trimmed off afterwards. There are many such walls in the West of England now. They were constructed by an artisan called a "mud plasterer." Other trades one meets with were those of the torcher, who filled in between the quarters, barrow men, masons, carpenters, and tilers. Oak shingles were, for the most part, used for roofing, but in London, as early as 1189, an assize of merchants was convened to discuss any possible remedy against the frequent and destructive fires, and tiled roofs were advocated and became more frequent. Stone party walls were also judged as desirable, and special directions were issued as to how thick these should be built, and as to ownership. Three feet was the thickness prescribed, one-half on each owner's land, and either might raise it at his own expense. It should be noted, too, that neither, when raising, could obtain an easement of light in such a wall.

It was necessary that a house but insufficiently warmed should have as few and as small apertures in it as possible; hence the windows were of meagre description. Glass was rare before the sixteenth century, and the "wind-holes" or "loop-holes" were closed by a shutter or covered by canvas. Floors, originally of beaten clay, were later paved with flag or cobble. The walls were plastered and coloured or whitened. The author instances a number of cases in which "archil" mixed with lime was employed, which produced a deep blue wash; or copperas was used, which imparted a green tone.

Floors were paved with flag or cobble. Upon the former, patterns were sometimes drawn with pipeclay, after the manner of the pavement artist. The thresholds of cottages and stables are still sometimes embellished in this manner.

Thus far we travel in the author's company; beyond this he does not take us. The distance covered is not great, for he leaves the hut style still predominant. All reminiscences of hut architecture had to be abandoned and the single chamber accepted as a focus only of a plan providing for the necessaries of a more civilised life, before a really important advance occurred. It cannot be doubted that this end was accomplished by grafting the more elemental idea upon principles of house planning which had been long since laid down.

The Greek, the Roman, the Cairene house, had all taken the same form, and the English house, when it began to develop at all, prepared to follow it. It is only the hut which is rectangular; a house begins to shape itself and group its plan around a court on two, three, or four sides. A wing thrown out from the rectangular plan, forming two sides to a stock-yard, is the first step, and so we reach the more elaborate grouping of the sixteenth-century house, with court and grass-plot and sundial. We are never likely to return to the simplicity which has been presented to us. An additional number of rooms for sleeping accommodation especially has become necessary to us. But we may very well consider whether the middle-class house, which is but a bastard affair, and a poor imitation of the large Elizabethan house, may not be simplified. Three small reception-rooms, which are now thought to be so necessary for a house of this class, are, we think, both useless and uncomfortable. There is no space or pleasure in any one of them. A larger room as a living room is, we feel sure, a most desirable thing, and may easily be obtained by reducing the size of the two remaining rooms. A much smaller withdrawing-room or "bower" and a still smaller study or writing-room—the *tablinum* of the Roman house—may fill the space left upon the plan. Since the hall should be something more than a passage and staircase, the *tablinum* may be a part of it, and occupy a bay curtained-off. Except in a bungalow plan, it is not convenient to carry the chief room to the height of the roof, since the area of the first floor would be too much curtailed by so doing; yet this height might be most effectively attained when possible.

Consideration may also be given to the use of materials in mediæval times. Half-timber construction can only be used conditionally. An examination of old work will reveal the numberless patchings that the shrinkage and twisting of the oak quarters has brought about. Bitumenised fir is, perhaps, the safest timber to be so used. Teak is eminently adapted to the purpose, but it is costly. But plaster, in skilful hands, may be made much of, both ornamentally and constructionally. In the former direction its capacities are limitless, and only await the humour of the artist. As a building material also we believe that much more might be made of it than is done at present, particularly when laid upon wire lathing. Shrinkage is the one fatality that awaits the employment of wood in any form. The Paris Exhibition buildings are now being ingeniously erected in plaster laid upon an iron skeleton. Brick has, however, so entirely nationalised itself that its use is likely to remain general. If the size of a brick could only revert to the old measurements, which did not exceed some 2 in. in height, the effect would be far more pleasing. The Italian brick, for the most part, still adheres to these proportions, although a brick even larger than our own is unfortunately beginning to supersede it, in the laying of which we presume time is saved.

The book is one of the Social England Series, and is for popular reading. We sincerely hope that Mr. Addy may convince the yearly tenant that simplicity and even humility may be exhibited in the arrangements of a dwelling, and its comfort and dignity increased thereby.

REPAIRS AT LINCOLN'S INN AND THE GATE HOUSE.

UNDER the superintendence of Mr. Dennett H. Barry, Surveyor to the Benchers, some extensive repairs have been begun upon these buildings, by Mr. Alfred Bush, contractor. The works will comprise, we gather, a complete remodelling of the drainage and sanitary arrangements, where needed; the repointing of the brickwork of the big gate house; the renewal of the stone coping and upper walls of its two towers; and the reparation of the gates, which, it is believed, are the original oaken doors made and hung in 1564. The gate-house was begun in 1507, one year after the completion of the (old) hall, and finished in 1520, by Sir Thomas Lovell, K.G., Treasurer of the Society, whose coat-arms, with those of Henry VIII. and Henry de Lacy, Earl of Lincoln, *obiit* 1312, are on the front, repaired in 1695. The timbers are of oak brought from Henley-on-Thames; most of the bricks and tiles were made of clay dug up in the Coneygarth on the north and west sides of

the (new) hall and library—Hardwick, architect. The front shows the greater part of the red bricks as originally laid with black bricks in a lozenge pattern, and places where alterations have been made when the British bond and Flemish bond were in use. The bricks of the top courses and of the parapet above the gateway are later, and of the larger size which resulted on the passing of the Brick Act, 24 Geo. III. c. 24, which levied a duty of 2s. 6d. per thousand. On the completion, in 1885, of the new buildings, begun by the late Sir G. G. Scott and carried on by Lord Grimthorpe on the site of Nos. 2-15, Old Buildings, it was proposed to resume the work southwards and to clear the site of the gate-house and the adjoining chambers. The late Mr. A. Cowper Ranyard, F.R.A.S., a member of the Inn, took a leading part in the movement for preserving the gateway, despite the scare that had been raised as to its being in an unsafe condition, the foundations being somewhat shallow.* In April, 1890, the rooms of the north tower were stripped of their oak and deal panelling (made without the employment of the rebate plane), and the Benchers, advised, we learn, by Mr. F. C. Penrose, shored and bolted up the north tower with six bolts, two of which stretch across the first floor of the north tower. On stripping the wall, north side, of that room, was found cut in the brick, 2 ft. 4 in. from the floor line, a curious recess, or aumbry, 1 ft. by 8½ in., and 18 in. high, the top being pointed; it was plastered on its face and sides, and black with age. The rooms over the gateway were once occupied by Sir Matthew Hale; traces of vaulting may be seen in the archway beneath. The numbering of houses in London did not become general until after the passing in 1762 of the Act as to signboards, but, as at Oxford and Cambridge, the staircases of the Inns of Court were marked by numbers in the beginning of that century. The Lincoln's Inn Red Books contain an entry, the first of its kind, of the admittance of a Mr. Hungerford in 1715 to "Two chambers in Gatehouse-court and Chancery-lane Row number (1)"; for 1720 there is an entry relating to No. 26—both still stand; we have seen a letter addressed to Serjeant, since Baron, Pengelly, "at his chambers in the Inner Temple, Tanfield-court, nr. (3), London," and dated May 22, 1712.

NOTES.

The Supply of Artisans.

THERE is no subject which at the present moment is attracting greater public attention than the exodus to the towns of those born in rural districts. We read constant lamentations on this point, and all sorts of absurd remedies are suggested to put a stop to it. It seems to be forgotten entirely that with the growth of our towns there is a constant demand for good, honest, strong, and healthy labour. As a rule, such labour must come from the country, to a very large extent. The very fact, therefore, which the agriculturist laments is a subject of congratulation to the builder and contractor and a large number of other capitalists. Make the conditions of labour as satisfactory in rural districts as in towns, and the supply will gravitate again naturally, to some extent at least, back to the country, or rather it will remain there. But any number of letters may be written to the newspapers without avail. As we have said, however, it is just as well to recognise that there is another side to the question, and that if the farmer is afflicted the employer of labour in urban districts is well pleased.

* We know, as a fact, that Mr. Ranyard was prepared to purchase the fabric from the Society, having assured himself of its stability

Drought and Water Supply.

THE change in the weather, accompanied by a few smart showers of rain, has led people to believe that anxiety concerning the water supply is at length at an end. How far that is from the truth is apparent enough to those who know how much rain has to fall to do much for a large water supply. In many parts of the Thames watershed area the rain which has fallen during the past week has not been sufficient to do more than to lay the dust, and even where showers of an hour's duration have favoured the district, the rain has not soaked into the ground more than an inch or two. To become available for water-supply purposes, it is necessary for the rain to be abundant enough to penetrate underground, and there to store itself up for a long period. A day's steady rain would undoubtedly raise the level of the Thames at the points of intake of the water companies, but, unless the downpour were maintained, the river would drop to its former level in two or three days. The rivers have not yet recovered from last year's drought, and, added to the present condition of affairs, we may look forward to a very low Thames next summer, even if the rainfall between now and then should be exceedingly plentiful. The underground storage which supplies the river has been sadly depleted by natural causes for two years, and water percolates so slowly from the surface that partial replenishment is all that can be hoped for for next year's supply. In the meantime certain London water companies are doing a great deal to prevent waste of water, and, providing the proceedings they are taking are not of a vexatious character, the public may be reckoned upon to assist them. It is doubtful whether wholesale prosecutions, such as are now being applied, will have the desired effect. There is a strong impression abroad that leakage from the street mains, and faulty connexions, have much to do with the known water waste. If that be the case the remedy largely lies nearer at home, and not in the police courts.

Swarkestone Bridge, Derbyshire.

THE writer of a letter in the *Times* directs attention to some new work which, despite protests made to the County Council and the local archæological society, is being carried out at Swarkestone Bridge. He says that round arches, about 3 ft. thick, of blue brick are being built under the pointed arches, fourteen in number, and covering up the ribs of the soffits, by way of strengthening the structure. The bridge, which has a total length of 1,304 yards, spans the River Trent at a spot distant five miles south-east from Derby, where the low ground is subject to winter floods. The bridge marks the extreme limit of Prince Charles Edward's march into England. Its north end was held by an advance party from his main forces during their brief sojourn at Derby, December 4-5, 1745. Just one hundred years previously Colonel Hastings, seeking to secure the passage of the Trent for the King's army, had constructed some earthworks at the bridge and fortified Sir John Harpur's house there, but after an obstinate defence he was dislodged by Sir John Gell and Sir George Gresley's troops, who thus opened the pass of the river to the Parliamentarians. The injury to the architectural character of the bridge is very much to be regretted, and the strengthening operation seems to have been carried out with total disregard to this; but at the same time, if the bridge had become unsafe for its traffic, it would seem that the only way to preserve it as an archæological monument would have been to leave it as it was and build a new bridge; and it could hardly be expected that the County Council would feel justified in doing this.

The Architectural Association Lectures.

FROM the pamphlet just issued by the Architectural Association, giving particulars of the curriculum for session 1899-1900, we learn that the courses of lectures will commence on October 9. The lecturers and instructors are the same as last year, the committee feeling, no doubt, and with reason, that they could not find abler men to carry on the educational work of the Association. The list of lectures to be delivered at the fortnightly meetings of the Association is not quite complete, but the present arrangements give promise of a most interesting and useful programme. The President will deliver his opening address on October 6, and at subsequent meetings the following papers will be read:—"The Construction of Circular Stairs and Spiral Vaults," by Mr. Lawrence Harvey; "Marble," by Mr. W. Brindley; "Art as Appplied to the Weaving and Printing of Textile Fabrics," by Sir Thos. Wardle, K.B.; "Colour Decoration in Relief," by Mr. Gerald Moira; "The Dome as the Basis of an Architectural System," by Mr. Arthur Bolton; "Cast Iron," by Mr. W. R. Lethaby; "Working-class Dwellings in Blocks," by Mr. Thomas Blashill; "The Exterior Treatment of Sharp or Acute Angles in Street Buildings," by Mr. A. W. Hennings; "Small Houses," by Mr. C. E. Bateman; "The Paris Exhibition," by Mr. E. H. Bennett; and "Egyptian Temples," by Mr. Alexander Payne. Mr. Basil Champneys is also to read a paper, but the subject is not yet arranged, apparently. We hope that the lectures will be well attended; it will not be due to a lack of interesting subjects if they are not.

Electric Power at Niagara.

IN a letter to the *Times* Professor Forbes gives an account of the commercial developments which have taken place owing to the cheap power available in the neighbourhood of the Niagara Falls. During the last four years a great number of enormous factories have been established on the land of the Electric Power Company, and at the present moment they consume 34,590 h.p., all of which has been generated at the Falls. Next month the opening of two new factories will bring the total up to over 45,000 h.p. which will bring in an income of 150,000*l*. The operating expenses are under 25,000*l*., so that the undertaking has turned out a great success. It seems probable, therefore, that wherever there is a great demand for power, whether electrical or mechanical, then a water-power station for generating electricity will prove a financial success. The success of the Niagara Installation has been due in great measure to the

enormous advances that have taken place in recent years in electro-chemical and electro-metallurgical processes. The electrical manufacture of carbide of calcium, aluminium, carborundum, alkali, graphite and litharge are all being busily prosecuted and new towns for the workmen are springing up in the neighbourhood. From an English point of view, the method of distribution by overhead wires, and the generally ugly construction of the transmission line to Buffalo, seem very primitive, and remind one of the earliest electric light stations in the United States. Professor Forbes takes great credit to himself for the success of the scheme, which he attributes in large measure to the design of the installation. In such a favourable spot, however, almost any good design would have been a success, whether direct or alternating, high frequency or low frequency current were employed.

The Future of the Telephone.

THE Government Telephone Bill was admittedly a compromise between the advocates of a Government Central Telephone System, those who advocated municipal telephony, and those in favour of private enterprise. Like all compromises, it gives complete satisfaction to no one, and moderate satisfaction to very few. The Bill is not very clear, and its best friends must admit that it inaugurates a time during which many systems will be tried, and during which there will probably be no attempt at uniformity. The report of the Government Committee was decidedly in favour of nationalising the telephone, but for some reason which was never made clear it was considered by Mr. Hanbury totally impracticable. Failing its adoption the Committee recommended that municipalities should be allowed to compete with the National Telephone Company, and it is this method, with certain restrictions, which is incorporated in the Bill. Unfortunately, during its discussion in the House it had to undergo certain amendments, such as the extension in certain cases of the time of the licence of the National Telephone Company, which, however just from an equitable point of view, will undoubtedly delay the final settlement of the question. Some telephone engineers have been inclined to make too much of the difficulties in the way of nationalising the telephones, and talk about the enormous difficulties—the thousands of miles of connexions and the hundreds of thousands of switch parts—in the way of constructing a system for only ten thousand subscribers. Still there are large systems in America in actual operation, and it is reasonable to suppose that a national telephone system managed by a central department would do more for us as a nation than a heterogeneous collection of systems bound together by the Post Office network. Inter-communication throughout the land by telephone would be a great boon, but the Government Bill will not help us much. In the immediate future the opposition to the National Telephone Company will improve the service, but long before the licences expire it will probably be apparent to everyone that this present advantage has been secured at too great a price.

Sewage Purification.

ONE of the best résumés of the recent developments in sewage purification is to be found in Dr. Rideal's four Cantor lectures on the "Bacterial Purification of Sewage." They appeared in the *Journal* of the Society of Arts during the month of July, and are well worth the attention of all who wish to obtain a clear and accurate account of the subject in a small compass. To architects the most interesting passage in the lectures will probably be that which describes Mr. Scott-Moncrieff's latest invention, as it is designed for the purification of sewage in small quantities. The sewage enters a small chamber, from which it passes into the bottom of a larger chamber where it rises through a grating and a superimposed bed of coke or other filtering material; from this it overflows on to the uppermost of a series of nine trays, placed one below the other, with a 3-in. space between, and each tray filled with coke to a depth of about 7 in. The sewage passes vertically downwards through all the trays in succession, and is carried away by the effluent drain at the bottom. It is found that each tray effects a special part of the purification, allied groups of purifying organisms gathering together at different levels; the total purification effected is extremely high. Dr. Rideal gives analyses and diagrams in proof of the efficacy of the process; and, as it has the merit of simplicity, we can heartily commend it to the notice of architects who are called upon to advise as to the disposal of sewage from buildings which have no access to a public sewer.

Drought and Steam Boilers.

A SOURCE of danger, not commonly recognised, is apt to arise in connexion with steam boilers during a continuance of dry weather. Owing to insufficiency of water from the ordinary sources of supply, feed-water may be drawn from disused wells or from muddy ponds. The owner is probably unaware of the danger incurred, and when a collapse takes place the attendant is usually surprised and not infrequently seriously injured. The immediate cause of such a mishap is overheating of the furnace plate, or in a multitubular boiler of the tubes, and the primary cause is the formation of a saline or muddy scale. This scale, being partly detached from the plate, forms an annular space at the point where a bulge is afterwards developed, and the space becoming filled with superheated steam, prevents the proper conduction of heat from the fire. As a result the plate grows red hot locally and a bulge occurs, which grows worse in proportion as the iron grows softer, until at last an explosion takes place. It is very much to be desired that all persons having the control of boilers should know how danger may sometimes be caused by a thin and recently-formed deposit on the plates.

English Canals.

WORKS of unparalleled importance are now being prosecuted in various parts of the British Empire and its dependencies. Strangely enough, in England, the fountain head of the tireless energy to which such undertakings owe their birth, progress is always slow and retrogression is not unknown. An example of the latter is furnished by our canal system. Owing in some measure to lack of enterprise on the part of the owners, and to apathy of the public, but chiefly to the fact that they have gradually come more or less under the control of powerful railway companies, these waterways are rapidly falling into desuetude and disrepair. From the point of view of a railway company, this may possibly be a gratifying circumstance; but that it is in every way opposed to the welfare of the community, there can be no manner of doubt. If once completely freed from railway domination, and placed under the management of a central board acting in the public interest, it would be possible for existing canals to be reinstated, and for the system to be completed and organised in such a way as to prove of immense value to the country. A proper system of traffic would, of course, replace the sporadic methods of navigation now followed, and mechanical propulsion would be an essential feature. So long ago as 1860 it was demonstrated by Dr. Pole, as the result of some steam trials on the canal at Ashby-de-la-Zouch, that a speed of three miles an hour would be in no way detrimental to the banks; but in consequence of objections by the railway company, all attempts at reform in the direction of mechanical propulsion had to be abandoned. As the rate of speed attainable by the use of horses averages only 1¼ miles an hour, it will be seen that acceleration is necessary. Whilst not advocating the nationalisation of canals on the continental method, we certainly think adequate encouragement and protection should be afforded to these important highways.

French Official "Restoration."

WE have noticed already in our "Foreign" column that the French Government intended to take in hand the repair of the ancient church of St. Pierre on the hill of Montmartre; but it appears that, as in too many cases, the restoration will be carried to an extent which will go far to destroy all the value of the old church. The "Commission des Monuments Historiques," that well-meaning but dangerous body, have the matter in their hands; and, according to a correspondent in Paris, there is to be a new façade "in the style of the old building," the design of M. Sauvageot, which, we are assured, "will quite eclipse that of the Sacré Cœur." So it appears that, by way of showing their appreciation of an ancient building, the "Commission" and the Prefecture of the Seine (which is also implicated in the matter) intend to do their best to make it into a new one. Perhaps these accounts are a little exaggerated, since the sum named is only 12,000*l.*, which will hardly go far towards eclipsing the Sacré Cœur; but it is to be feared the real value of the ancient church will be obliterated.

LETTER FROM PARIS.

THE fine frieze of the façade of the larger Palace of Fine Arts in the Champs Elysées is now being fixed in position. This frieze, designed by M. Joseph Blanc, has been executed by the National Manufactory of Sèvres. That for the façade situated on the new large avenue, formed of mosaic work, and the largest frieze ever fixed at Paris, was designed by M. Edouard Fournier, and represents "Les grandes figures de l'Art."

The Sub-Committee of the International Congress of Architects in 1900 is preparing the list of its members. A number of persons not following the profession of architecture, but taking an active interest in the questions to be discussed, will be appointed members. The programme will comprise three principal matters for discussion: the artistic property in works of architecture; the teaching of architecture in various countries; and the subject proposed

for discussion by the British architects, that of cheap dwellings.

The Paris Commission of Health has, by reason of the state of things noticed by several of its members in the course of their visits to new houses at Paris, decided to again call the attention of the Municipal Council to the necessity of voting a resolution and making a regulation that every owner of a new building destined for dwelling purposes should, before giving up the apartments to the tenants, invite the inspection of the authorities, and obtain the special authorisation to be delivered by the Prefect. This is a very wise measure, for it is certain that a large proportion of the sickness and deaths at Paris is caused by the too early entering of the tenants into their new dwellings, often completed only a few days before entering, with health and sanitary arrangements scamped in the hurry to complete the various flats in time for inhabitation at the coming quarter.

M. Georges Cain, the Curator of the Carnavalet Museum, has now cleared away the useless but interesting lumber contained in the roof story of Carnavalet, and installed therein a curious museum of the Siege of Paris containing the relics of the *année terrible*—relics up to now carefully preserved by those who were actors or witnesses of the tragic events of 1870.

At the recent sitting of the "Vieux Paris" Committee, one of the members read a report on the non-observance of the regulations specially applied to the buildings on the Place Vendome, the Place des Victoires, and the Rue Royale. In order to preserve the interesting architectural character of these two squares and the street, a strict regulation was made many years ago prohibiting the owners or tenants to affix signboards or other such notices on the fronts of the houses. It is feared that the late changing of hands of several houses in the above squares will bring about new contraventions of this rule, and at the request of the Société Centrale des Architectes, the Commission has decided to look carefully after the observance of the regulation. A plea was addressed by the Committee to the "Commission des Monuments Historiques" for pecuniary aid to permit the restoration of one of the finest old churches in Paris, that of Saint Severin, which is in a serious state of dilapidation.

At the last meeting of the Academie des Beaux-Arts the following prizes were awarded: Prix Antoine-Nicolas Bailly, of a value of 60*l*., to M. Faure for his publications on architecture; the Prix Houllevique, value 200*l*. to M. Mayeux for his work entitled "Fantaisies Architecturales"; the Prix Bordin, value 120*l*., was divided—60*l*. to MM. André Bérard and Alfred Berthier, architects at Paris; 40*l*. to M. Henri Chabeuf, lawyer at Dijon and Vice-President of the Academy of that town; 20*l*. to M. George, architect at Lyons. The Prix Bordin for engraving, value 120*l*., was divided—80*l*. to M. Roger Marx for his work, the Medaillons Français; and 40*l*. to M. Henri de la Tour for his catalogue of engravings at the Bibliothèque Nationale.

Much excitement and considerable discussion has been occasioned amongst owners of property at Paris by the proposal brought up by M. Veber, a Socialist member of the Municipal Council, to revive and put into immediate practice the law of 1807 concerning the increase in value of property in Paris. According to the figures given by Vicomte d'Avenel in his work on the economical history of the town of Paris, taking into account the difference in the value of money and the interest on invested money since the middle ages, Modern Paris is worth two and a half times that of Paris under Louis XVI., eight times that under Louis XIV., and fifty times that under Henri IV. It is proposed to make property-owners pay for the increase in value attained by their property owing to the work of embellishment to the town and streets made at the expense of the Paris Municipality, by compelling the payment to the town of one-half of the increase in value attained within the last thirty years; but as such a measure would be very inconvenient to all concerned, and would of necessity produce a large number of law-suits and difficulties, it is proposed to charge such payment on all future building work in streets and properties on the line of new expropriations to be made by the Municipality.

A serious result of apparent want of forethought and care in the construction and working of the shields employed in the construction of the new Metropolitan Railway is visible in the large fissures which are now showing in the crown of the vaulting of certain sections of the line along the Rue de Rivoli. According to the explanations of an engineer, who has recently visited the various sections, these cracks, which extend for some length along the vault, are due to the employment of shields with sides brought lower than the springing of the arch, and the consequent necessity of constructing the abutments with the aid of the shield in a manner similar to the construction of the arch itself. The result has been that the abutments, being isolated from the surrounding earth, were unable to withstand the pressure of the vault when the masonry began to settle, and, giving way slightly, allowed the top of the abutments to spread and thus dislocate the centre of the crown. In some of the sections this defect was noticed soon after the commencement of operations, and the shields were altered and employed for the building of the arch only, the abutments being built in the ordinary manner against the side walls of earth. It will probably now be necessary to cut out the crown of the vault already built and build it afresh in as solid a manner as possible. This will, of course, considerably delay the work.

The jury of the competition for designs for the small buildings for access to the underground railway, of which we have already spoken, have awarded the first premium for the "general type" to M. Duray, and also that for the design for the Place de la Bastille. For the design for the Place de l'Etoile only the third premium has been awarded, and has been divided equally between MM. Bonifassi, Duray, Rey, and Letrosne.

The anarchists, who for some years have preserved a prudent silence, are unfortunately on the alert again, and are now directing their attention not to private property but to public monuments, beginning with the churches. The Church of St. Joseph, which they pillaged the other day, is one of the best of the modern Paris churches; a large building in Romanesque style, built from the designs of Ballu in 1867-1874. The porch is decorated with paintings by Paul Balze, and the glass-painter Oudinot carried out a good many windows in the church. The chapels contain some fine paintings of the Italian and Flemish schools of the sixteenth and seventeenth centuries, and there is some fine carved woodwork, and modern statues by MM. Moreau-Vauthier, Maillet, Delaplanche, Barthélemy, and Gautherin. St. Nicolas aux Champs, the façade of which has been damaged by the anarchists, is a very ancient church, dating from the twelfth century. Fortunately M. Sebastien Faure and his mob spared the interior, which is a kind of museum of old paintings, &c.

The Direction des Beaux-Arts is occupied with the installation of the Louvre collection in the ancient Salle des Etats, which it is hoped will be opened next year along with the great Exhibition. The work necessitates a complete alteration in the arrangement of the Louvre, for the whole of the Salle des Etats is reserved for the Rubens collection, and the fourteen small adjoining rooms will receive the smaller works of the Dutch school. In the vestibule preceding the Salle des Etats will be exhibited the works of Rubens's two great pupils, Vandyck and Jordaens. The Galerie Lacaze, which formerly contained the Dutch collection, will be reserved for the works of eminent French painters of the early part of the present century. It is to be hoped, for the sake both of the public and of the pictures, that the enlarged accommodation in the Louvre will lead to the discontinuance of the practice of hanging some of the pictures so high that they cannot be seen, and that the management will in this respect follow the example of the principal foreign galleries in limiting the height of the hanging line.

A new Utopian city is projected by M. Elysée Reclus, the geographer, who is endeavouring to raise the necessary capital for the erection of a model town, to be called "Garden City;" a town of the future, to be built on the most hygienic principles, and with the latest scientific improvements. Each private residence is to unite the advantages of a country house and a town house. The happy inhabitants of "Garden City" are to breathe pure air and enjoy an abundant water supply; the streets will be wide, and there will be large parks and public halls. In the centre is to be a large garden around which will be grouped the Public Library, Theatre, Museum, Town Hall, Concert Hall, and Hospital. Such is the general sketch of the ideal city which a group of dreamers are proposing to found no one knows where. It is regarded as a kind of new edition of the "phalanstery" ideal of fifty years ago.

THE ARCHITECTURAL ASSOCIATION SUMMER VISITS:

MOOR PARK, RICKMANSWORTH.

MOOR PARK, near Rickmansworth, was visited on the 26th ult., by permission of the Right Hon. Lord Ebury. A party of about twenty attended, and was met at Rickmansworth by Mr. Couchman, the agent of Lord Ebury, who conducted the visitors through the park to view the site of the house which anciently was the place of residence. Nothing of this remains but a long red brick garden wall. The present house was then approached, and there the visitors were received by Lady Ebury, who, with great kindness, showed the house and the adjoining grounds, also the kitchen garden and dairy, which are at a short distance to the south.

The manor of the More and More Park as Chauncy calls it in his "History of Hertfordshire" (date 1700) has passed through very many hands. It appears that the owners of the park have not always been owners of the manor, but either or both have been held by the Abbey of St. Alban, whose tenant was Ralph Boteler in 1457; by George Nevil, youngest son of Richard Earl of Warwick, and sometime Bishop of Exeter, Chancellor of England (1460) and Archbishop of York; by the Crown; by John Vere, Earl of Oxford, to whom it was granted in 1485 for services at Bosworth Field; by Cardinal Wolsey, at whose disgrace it again fell to the Crown, and was attached to the Duchy of Lancaster by Philip and Mary; by Francis Russell, second Earl of Bedford, who received it from Elizabeth, and in whose family it remained till it again reverted to the Crown in the reign of James I. The latter granted it to the third Earl of Bedford, whose widow constructed the gardens celebrated by Sir William Temple (of which there are now no traces), and who sold it to William, Earl of Pembroke.

The house had been rebuilt by the Duke of Monmouth in 1685, and was considered the best piece of brickwork in the kingdom at that time. In 1720 the house was bought of the Duchess of Monmouth by Benjamin Heskin Styles, who had amassed a large fortune by means of speculation in the South Sea stock. This owner cased the house in stone (Portland), and added the portico of Corinthian columns 50 ft. high, and two wings, or subsidiary buildings, connected to the main block by means of quadrant colonnades. The elevation and ground plan are given in "Vitruvius Britannicus." The architect was Giacomo Leoni. The interior decorations carried out at that time were by Sir James Thornhill, who painted the ceiling of the saloon on the north-east front and that of the entrance-hall, which was at that time heightened so as to include two stories. The ceiling is painted with the perspective representation of the interior of a dome. Other decorations were executed by Amiconi and Steter. These works are said to have cost upwards of 150,000*l*. The property was subsequently bought by Commodore Lord Anson. About this time the present kitchen garden and part of the pleasure grounds were laid out by "Capability" Brown, and his work as seen in its present condition is undoubtedly in many respects very satisfactory.

Thomas Anson, M.P., brother of the last-named proprietor, sold the property to Sir Lawrence Dundas in 1763. He it was who converted the rooms on the north-west front (ground floor) into a gallery. This is now used as the dining-room, and is an extremely fine apartment. The ceiling, which is divided into panels of various shapes by beams, was decorated by Cipriani, and is a very beautiful feature of the room. There is also a white marble mantelpiece, the frieze of which is remarkable, as having a series of figures about 8 in. high, the marble background to which has been cut away and replaced with lapis lazuli of the very finest description. Sir Lawrence Dundas provided the main rooms with very sumptuous furniture from the designs of Adam, and some of the chairs, carved and gilt and upholstered in very beautiful silk brocade, were inspected by the visitors with great pleasure. There is also in

the house a considerable amount of Chippendale and old French furniture of the greatest interest.

Sir Lawrence Dundas sold the house in 1785 to Thomas Bates Rous, who, though he only possessed it during four years, managed very effectually to rob it of great part of its dignity by pulling down the whole of the wing and colonnade on the south side and part of that on the north, so destroying the chapel and offices, the latter being replaced by the conversion of the basement to their uses. In 1801, Robert Williams, merchant and, subsequently, banker, who is said to have in his early days actually made some of the furniture placed in the house by Sir Lawrence Dundas, became the owner by purchase. He was succeeded by his son Robert, who at a time of pressure on the bank in 1828 sold the house and park to Robert, second Earl Grosvenor, afterwards Marquis of Westminster. During his ownership the Italian garden on the north-east front and the approach to the upper pleasure garden were laid out by W. Eden Nesfield. The next owner was Lord Robert Grosvenor, afterwards Baron Ebury, who remodelled the offices, W. Burn being his architect. The property is now owned by the present Lord Ebury, second Baron. While the exterior features of the design are somewhat heavy the house is quite palatial in style and proportions as it now stands, though the lack of contrast, by the loss of the wings and colonnade, is greatly to be deplored.

Besides the features previously mentioned there are ceilings modelled with figures in the drawing-room and in one of the bedrooms, and a small room on the N.E. front is interesting as being papered with a very beautiful old Chinese wall-paper.

The visit terminated by a view of the stables and of a very interesting octagonal room at the Rickmansworth lodge. This is about 20 ft. in diameter with a domed ceiling, and was decorated by the brothers Adam—each corner of the room having an engaged column which above the frieze branches out into a kind of palm-tree. In passing to the station a picturesque red brick water-mill building attracted attention, and finally Mr. Couchman allowed a view of a house known as the Priory, but now used as Lord Ebury's estate office. A very interesting looking old house called The Bury also excited the curiosity of the visitors, but time did not allow of its being viewed.

THE SANITARY INSTITUTE CONGRESS.

THE proceedings of the eighteenth Congress of the Sanitary Institute commenced at Southampton on Tuesday last with a public reception of the members and officers by the Mayor of Southampton (Mr. Councillor Hussey) at Hartley College. The Mayor was accompanied on to the platform by Sir Wm. H. Preece (President of the Institution of Civil Engineers), the President of the Congress, Sir Wm. Pink, Mr. H. Law, C.E. (Chairman of Council of the Sanitary Institute), Alderman Lemon, F.R.I.B.A., &c. (ex-Mayor of Southampton), Sir J. Ewart, Major Lamorock Flower, Dr. Bostock Hill, Dr. Louis Parkes, Mr. White Wallis (Secretary of the Institute), Mr. H. P. Boulnois, C.E., and other members of the Council. After the reception an adjournment was made for luncheon to the Royal Pier Pavilion, where the Mayor presided.

After the luncheon the first sitting of the Congress was held in the Lecture hall, Hartley College, when the President of the Congress delivered his inaugural address. Sir Wm. Preece began by referring to many previous addresses which he had given in that hall during fifteen of the busiest and happiest years of his life, but he was now to open a tale of discovery, research, and practical application as startling and beneficent as any that had characterised and immortalised the marvellous age of Queen Victoria. After an appreciative reference to the sanitary work of the late Sir Douglas Galton, one of the founders and most steadfast supporters of the Institute, he enunciated the bacteriological theory of disease. He said, our chief diseases are due to this invasion of millions of micro-organisms flourishing in the body of every person in the hall. Every year was prolific with new bacterial facts, and, doubtless, that meeting of the Sanitary Institute would disseminate new truths, and help to enlighten many an obscure point. There were three very important principles underlying all the practical applications of sanitary engineering: (1) Energy, or the ability to do work; (2) Chemistry, or the power to transform matter; (3) Life. The greatest sanitary engineer the world had ever seen was Moses. The Book of Leviticus was a treatise on hygiene. The doctrines of Moses could be summed up as the objects of sanitation to-day—pure air, pure water, pure food, pure soil, pure dwellings, pure bodies. The development of these six points constituted the main portion of the address, the part played by electricity in the application of the principles of hygiene being frequently referred to. Electricity had not played an unimportant part in assisting the sanitary engineer in his attack on sewage. The oxygenation of water by electrolysis had been attempted in the Hermite process, and sea water so decomposed, producing a liquid called Hermitine, was laid on at Netley Hospital like water, but its economy was doubtful in the face of the astonishing results of bacteriolysis realised in several systems in which the biological principle had been successfully applied in recent years to the treatment of sewage. With regard to pure dwellings the President said legislation had in recent years empowered Local Authorities to improve the dwellings of the working classes, but they were, unfortunately, much hampered by the greed of vested interests. Edinburgh, by spending 560,000*l.* on improving the housing of the poor, had brought down the death rate from 28 to 17 per 1,000, and the effects of rigid inspection, and a thorough application of their powers by Local Authorities, was shown by the death rate in Surrey, which was only 14 per 1,000, while in North Wales (where the application of powers was less thorough) it was 20 per 1,000. An important feature of the introduction of electricity into the home was its cleanliness. It neither vitiated the air, deposited dirt, nor destroyed gilding, nor injured the bindings of books. The electric light was the greatest boon, and it was essentially the poor man's light. If electric traction became general the supply of electric light could be made the most economical source of illumination. There was a great demand for a day-load wherever electrical energy had been generated for lighting purposes. If all the means which science now placed at our disposal were properly applied to sanitary purposes, he saw no reason why David's span of life from three score years and ten should not be extended to five score. They could add at least 30 per cent. to the strength of the nation.

In concluding his address, the President paid a tribute of praise to the work of the Institution, and a hearty vote of thanks was accorded to him at the close.

The Congress, on resuming on Wednesday, was divided into eight different sections for conferences on eight classes of subjects, including a ladies' conference, which discussed questions of "Domestic Hygiene." Of the five others the most numerously attended were the Conference of Municipal Engineers and Surveyors, presided over by Mr. E. Purnell Hooley, County Surveyor, Nottinghamshire, held at Hartley Cottage; that of Municipal Representatives, held in the Council Chamber, Municipal Building, presided over by Mr. Alderman Walton, Southampton, and that of the Sanitary Inspectors, held at the College, over which Mr. C. MacMahon, Chief Sanitary Inspector, Torquay, presided.

MUNICIPAL REPRESENTATIVES CONFERENCE.

Mr. Alderman Walton, the President, who is Chairman of the Health Committee of the Southampton Corporation, gave in his inaugural address many interesting particulars with regard to the history of the county borough, its rapid growth in the last decade, and its progress from the sanitary point of view. The port of Southampton was celebrated in the Middle Ages, being, on account of its proximity to the Continent, the port of embarkation for some of the great military expeditions of those times. Its position, only twelve miles from Winchester, the ancient capital of the kingdom, made it the chief port of intercourse and trade with Normandy, a characteristic it still retained in modern times, through its splendid estuary, its double tides, and the attractiveness of the New Forest, which skirts it to the west. The census of 1891 showed a population of 65,325, and in 1895, after its boundaries had been enlarged, it contained a total of 94,093, the estimated increase to last year being 103,168. It had from various causes been rather late in introducing sanitary improvements, but they could boast now of possessing one of the best supplies of pure water in the kingdom, which was obtained at Otterburne, about nine miles from the town. A new scheme of sewerage, at the cost of 100,000*l.*, was now being carried out. No sewage was now allowed to flow on to the western shore, which had been the black spot in the otherwise fair fame of the town. The sewage was treated chemically, the effluent deprived of its noxious elements being alone turned into the river. These improvements, which included a refuse destructor, in which the street refuse was burned, had been effected by the Works Committee.

As to the work of the Health Committee, of which he (the president) had been chairman for the past seven years, much good work had been done since the appointment in 1890 of Dr. A. Wellesley Harris as Medical Officer of Health, the construction of an isolation hospital being one of the most important features. The introduction of smallpox into the port in 1892, from the West Indies, had wakened them up, and they hurriedly adopted the Notification of Diseases Act. In 1893 they bought a vessel and constructed a floating hospital, which had been of great use, particularly to the port, and they were now building on an excellent site, about three miles from the town, an isolation hospital, the pavilions of which would accommodate 100 beds, at an estimated cost of 35,000*l.* A report presented by Dr. Harris in 1891 showed that 2,599 persons were housed in very insanitary dwellings, without proper light, air, or ventilation. An area of between two and three acres, most of the buildings on which were very old—very picturesque, and teeming with historical associations, but hot beds of disease—had been chosen by the Council on which to erect a municipal lodging-house containing about 200 beds. It was now nearly completed and a block of artisans' dwellings was also in progress. By order of the Local Government Board the scheme was divided into three sections. No. 1 was now nearly completed, and then the next section would be proceeded with. Up to 1892 the administration of the port was distinct from that of the Borough, but they were now combined, and the Port Sanitary Authority had a wide jurisdiction, extending from the Solent up the Hamble, the Itchen, and the Test rivers, through a course of twenty-five miles. The President, at the conclusion of his address, touched briefly upon the electric works and the tramways.

A vote of thanks was accorded the President on the proposal of Major Lamorock Flower, which Mr. Alderman Walton briefly acknowledged.

Housing of the Working Classes.

Three papers were then given, two on the question of housing the working classes, by Mr. Thomas Blashill and by Mr. C. J. Hair, A.R.I.B.A., and one on "Common Lodging-Houses," by Dr. Porter, of Stockport, a discussion following.

Mr. Hair confined himself to giving some of the practical difficulties usually met with by architects and suggestions as to the way in which they might be overcome. The high price of land constituted the first difficulty. Unless a rent almost prohibitive to working men was charged, it was impossible to make a profit on building workmen's dwellings. This could practically be overcome in some cases by devoting the lower part of the building to shops, and thereby obtaining a commercial rent for valuable frontages. Up to the present it had been found impossible to get the very poorest (who are generally the class to be provided for) to occupy the new buildings. This constituted a fresh difficulty.

The lodging-house came nearest to the class of building wanted for rehousing the poor. But nowadays something more than the lodging-house common room, with dormitories above, must be provided. There must be dining and recreation rooms, kitchens, lavatories, and bath-rooms; and the dormitories must be divided into cubicles, so that each individual has a room to himself. That kind of building had been made to pay in London; and, if it were possible to give this extra accommodation, so much the better. He thought a somewhat cheaper scheme should be devised in the poorer districts to compete with the demand for a fourpenny doss.

A diagram of such a lodging-house was shown, to accommodate ninety-six men if built two

stories high. Another diagram showed a plan of artisans' dwellings being erected by the author for the Corporation of Southampton. A third diagram showed an associated plan of artisans' dwellings.

With regard to materials, everything must be as fireproof as possible. "For walls," continued the author, "good bricks are the cheapest and best material, though I don't think the time is very far off when we shall make a greater use of concrete for building walls. There is a very good hollow fireclay brick made by the Shepwood Company, 2½ in. thick for internal walls, which can be bought either glazed or plain, or with a fluted surface for plastering. These were used in the bath-rooms and water-closets at the lodging-houses here, and are, I consider, a great success.

Glazed Bricks.—This is the best and most sanitary building material that can be made, but has the drawback of being very expensive; however, I think that it is the only material that should be used for dados in corridors and staircases, and round sculleries and water-closets, and quite justifies its extra cost, although it is generally the first item that is cut out when the cost of a building has to be reduced. To clothe the walls of a scullery from floor to ceiling with glazed bricks would be extravagant, but it is necessary as a dado.

Floors.—These have to be of concrete, and the most usual form is 6 in. thick on rolled steel joists, the concrete being made either with furnace clinker or coke breeze. This is at present the cheapest kind of concrete floor, but has the drawback of being very heavy, and I believe that when the nature of concrete is better understood these floors will be made about 3 in. to 4 in. thick; in fact, I have done them 4 in. thick, but only in small rooms. There are several patent floors made, but I have found it best and cheapest, as a rule, to stick to the plain solid concrete and steel joists.

The best coverings for floors are 1-in. boarding for living and bed rooms, nailed directly to the concrete, and a rendering of granite dust and cement for sculleries and water-closets.

Stairs.—Stairs should be constructed of good granite concrete moulded *in situ*, and should be ventilated by large unglazed openings on each landing.

Roofs.—There are, broadly, two kinds of roofs—'pitched' and 'flat.' The pitched roof is the best for appearance, and also for keeping out the wet, but has the drawback that it is not, as a rule, fireproof. The flat roof is fireproof, very ugly, and in crowded districts it can be made use of as a playground for the children, or as a washing and drying-ground."

In the course of the discussion, a question was asked as to the cost per bed of the municipal lodging-house referred to in the President's inaugural address, which was answered by Alderman Walton. He said the cost of the buildings was 11,000*l.* for 186 beds, but the cost of the whole scheme, including sections No. 2 and No. 3, which could not be commenced until the displaced people of section 1 had been rehoused, would be 30,000*l.* Besides the 186 provided for in the new lodging-house, provision was made for 148 persons in the artisans' dwellings.

Engineering and Architecture Section.

The following address was delivered before the "Engineering and Architecture" Section, by Mr. James Lemon, M.Inst.C.E., F.R.I.B.A., President of the Section:—

"Engineering and architecture cover such a large field, that I cannot in a brief address do full justice to these subjects; I can only refer to those branches of thought and practice which more particularly refer to the maintenance of the public health.

Pure Water.—The supply of pure water to our towns and villages claims the first attention of sanitarians, as it is a necessity of life, and without it various diseases are generated. The question as to a constant versus an intermittent supply, has been fought and won, and although in some towns and districts the water supply is intermittent, the almost universal opinion is in favour of the constant system. This change has swept away the storage cistern, with all its abominations, and the householder of to-day knows that if the water is not pure, it does not arise from defects in his house, but from the source of supply and defective distribution. . . . The supply of water per head in this borough, since the introduction of waste-water meters, and by the relaying of mains, has been decreased fifty per cent., viz.: from fifty-six gallons to twenty-eight gallons, and yet no resident will say he has not all he requires. I do not wish to tread on the toes of water companies, but I cannot help expressing a strong opinion, that the charges for baths and extra water-closets are taxes upon the public health, and should be prevented by Act of Parliament. If the statutory rate is not sufficient to include these charges, let the rate be increased accordingly. The Corporation of Southampton make no extra charges whatever, except for garden hose, and they give a constant supply of softened water for the rate of 10d. in the pound upon the rateable value.

As to the sources of water supply, I believe we shall see great changes in the near future; Maidstone has taught us a useful lesson, and rivers are no longer considered safe and reliable. Father Thames has been a good servant for many years, but he is becoming overtaxed, and the supply of water to the first city in the world should be above suspicion. It must either be largely supplemented or a fresh supply obtained from a new and independent source.

Sewerage.—The principles upon which the sewerage of towns should be designed are now so well understood that it is not necessary for me to dwell thereon. The chief points to be observed are a constant flow, so as to ensure self-cleansing, water-tight sewers, and adequate means of inspection. The improvement in our water supply, and the more general supply of baths have materially assisted the first point, and we now seldom see a modern pipe sewer designed by a competent engineer without the proper velocity.

There is also a marked improvement in the last few years in sewer construction, more attention being now made to the jointing. Iron pipes and patent joints to stoneware pipes are more generally used in water-logged and damp soils. The infiltration of water does not do much harm, except increase the quantity to be dealt with at the outfall, but it is a source of danger in times of drought when the springs are low, as it then lets out the sewage into the surrounding subsoil. The ordinary stoneware socket-pipe jointed in cement is, at its best, a poor form of sewer, but it is cheap, and by its means work is done which would not otherwise be attempted. The patents for jointing pipes are fast running out, and the result may be a reduction in price. The iron pipe has a great advantage over stoneware, as it is made in 9 ft. and 12 ft. lengths, consequently there are fewer joints. Iron can also be jointed to stand pressure, and with a head of water upon it, it is, in my judgment, the only reliable material.

These remarks as to sewers also apply strongly to house drains. If we want a thoroughly water-tight drain, we should use iron pipes; the cost is not much more per house, and the result as regards efficiency cannot be too highly estimated. I hope to see the day when iron pipes for house drains will come into general use. The testing of sewers and drains, and the enforcement of regulations as to water-tight joints, has led up to better gradients and smaller sewers. Local Authorities do not now look upon a pump with fear and abhorrence, as they know within reasonable limits what the annual cost will be. They also know that the pollution of rivers and streams will not be tolerated, and that some form of sewage disposal must be adopted. In order to do this effectually and economically, the flow at the outfall must be reduced as much as practicable.

Sewage Disposal.—The sewage question, like the poor, is always with us. It has been solved by every sanguine inventor who has taken out a patent during the last thirty years; but it is not solved yet. We are, however, settling down; medical officers, chemists, and engineers are now no longer in hostile camps—one party advocating the claims of land, another precipitation, and a third filtration, and so on. . . . . Bacterial filter-beds have now come to the front, and we are indebted to the State Board of Health at Massachusetts, to Mr. W. J. Dibden, Dr. Sims Woodhead, Dr. Rideal, and others for their experiments, and the valuable information they have afforded us. But do not let us set back the clock of time by expecting too much.

The principles laid down by the Local Government Board are sound, viz.:—

Rainfall and sewage to be calculated at three times the dry-weather flow.

Above three times and up to six times to be treated on storm-water filters.

Above six times the storm water may be discharged into a stream or on to prepared land.

The capacity of the filters to be taken at one-third for the fluid and two-thirds for the filtering material.

A cycle of eight hours for filling, emptying, and rest for aeration.

But when they ask that the filtered effluent, after double filtration through coarse and fine filters, should be pumped on to land suitable or unsuitable, then I part company with them. They are evidently waiting for the Report of the Royal Commission, and until that be received, they will stick to the old formulæ as to land. This policy of the Local Government Board is stopping the use of these bacterial filters, as they refuse to grant a loan for their construction unless this land irrigation be adopted. It is true Local Authorities can construct them out of rates, and I have received instructions to do so by the District Council of Berkhampstead. Inexpensive beds have been made at Sutton and at Harrow, by simply digging out the clay and burning it into ballast, but where you have no suitable clay and you have to bring your material to the spot, and construct clay or concrete walls, the cost is considerably increased.

Pure Air.—We examine our water supply, and we know by analysis, and by bacteriological observations, whether it is fit for consumption or not, but I am afraid we know very little of the air which we breathe. If we could see impure air in the same way as we can see impure water, more attention would be paid by the engineer and architect, and by the public generally, to the causes of its pollution.

It is not my province to trespass upon the duties of the medical officer by referring to the causes of preventable diseases, upon which I am not competent to offer an opinion, but I desire to call the attention of the engineer and architect to the works which he is called upon to design and to supervise. He is responsible for the construction of sewers and drains, dwelling-houses, public buildings and workshops, and for their efficient ventilation. Sanitary engineers are agreed that the drainage of water-closets, sinks, lavatories, and baths should be disconnected from the house and ventilated; but there is a difference of opinion as to the merits of the 'drain interceptor.' If it be abolished every house-drain will ventilate the sewer. Whether that is desirable or not I will leave to this section, in the hope that the question will be fully discussed by means of a paper on the subject.

The ventilation of sewers is one of those questions upon which a great deal has been said and written, but not much progress made. In most towns there is some kind of ventilation, Bristol being the exception; the reason given for this being the rapid fall in the main sewers, causing a strong current of air therein. It is, in my judgment, desirable that the air in sewers should be in connexion with the external air by openings in all desirable points. The air in the sewer is displaced by the increase in volume of the sewage, and if openings be not made for its exit, it will find its way out at places where we least desire it. When we consider that the cubical space in the sewer occupied by the sewage in the day is double that during the night, and that this space is increased during rain, we see at once there is a movement of sewer air going on which should be provided for.

There is a great deal to be said in favour of open gratings in the centre of the street, but they are liable to be closed by the near householder or the Local Authority, and therefore are not reliable. I have come to the conclusion that properly designed shafts should be provided, so that the air in the sewer may be changed as frequently as possible; some of these shafts will be inlets and some outlets, but in any case a diffusion of the sewer air will take place. While saying this, I freely admit there is not that necessity for sewer ventilation now as there was in the earlier days of sewer construction. Sewers are now better designed, have better gradients, are laid more accurately, and are better flushed, consequently there is less deposit of fæcal matter, less decomposition, and less generation of noxious gases.

Healthy Dwellings.—One of the first considerations is the adoption of a dry sub-soil. In crowded towns this cannot always be obtained, vacant spaces are swallowed up by the 'jerry builder,' and as many houses as possible crowded upon a given area; but the Local

Authority can make by-laws to minimise the evil.

They can stipulate that the entire area of the house shall be covered with concrete.

That the sub-soil be drained, and that the space under the floor be ventilated.

In most by-laws the Local Authority have adopted 150 ft. super as the air space. But is this sufficient? It is the area adopted in this borough, but it could be increased with advantage to the public health.

The height of rooms is fixed at 8 ft. as a minimum, but there should be some regulation as to the minimum area.

If the cubic capacity given in the Model By-laws, viz., 400 ft. per adult, be adopted, then a room cannot be less than 100 ft. area for two persons. This is too small, as it only gives a room 10 ft. by 10 ft. The area should not be less than 110 ft. In the Peabody Buildings the bedrooms are about 13 ft. by 9 ft., or 117 ft. super, which is a far better area. Under Section 91 of the Public Health Act, 'Any house or part of a house so overcrowded as to be dangerous or injurious to the health of the inmates, whether or not members of the same family,' is held to be a nuisance. But every Medical Officer knows this section is practically a dead letter. He cannot turn the poor people into the street, and he lives in hopes that his Authority will make some provision for those who cannot find suitable accommodation at a reasonable cost. But we move very slowly. . . . The Corporation of Southampton are carrying out an improvement scheme, and the Congress will be able to inspect the site and the buildings now being erected. The area is about 2¾ acres. The claims of the owners amounted to 40,000*l.* The costs, including solicitors' and surveyors' charges, was about 32,000*l.*, so that the cost of the land which the Corporation has acquired is about 11,600*l.* per acre. The effect of this is the municipal lodging houses and workmen's dwellings will be a loss to the town, if we throw upon them the cost of the site. I am afraid this cost will damp the ardour of the sanitary reformers, and it will be some time before the Corporation of Southampton will carry out a second improvement scheme. If this were an isolated case it would not matter, but unfortunately the municipal authorities of other towns, who have been engaged upon this work, have had a similar experience. The architect is thus handicapped at the start, as he cannot design workmen's dwellings which will repay the capital and pay the interest and working expenses plus this abnormally heavy ground rent. Then what is the remedy?

This question was most ably dealt with in a paper read by Mr. Percy Boulnois in the year 1893, in reference to the improvement scheme of the Corporation of Liverpool. The cost of the buildings was 70,946*l.*, and the land 67,000*l.*, making a total of 137,946*l.*, from which was deducted surplus land 2,797*l.*, leaving a net cost of 135,149*l.* The annual cost of maintenance, rates, water, gas, &c., was 1,650*l.* per annum, the income from rents 3,895*l.*, leaving a net surplus of 2,245*l.* per annum to meet the interest and sinking fund. If we put this at 6,757*l.*, and deduct the 2,245*l.*, there is an annual loss to the Corporation of Liverpool of 4,512*l.* The Corporation considered this annual charge for clearing the site too much to be thrown upon the buildings. They accordingly fixed what they considered a fair ground rent, and charged the difference to the rates. This is a way out of the difficulty; but it is only a transfer of account after all, and the fact remains that the difference between income and expenditure must be borne by the ratepayers. Will large towns incur this expenditure in the interest of the public health and for the benefit of the poorer classes? I do not think they will. Then some other remedy must be found to reduce the overcrowding in large towns. . . . . The evils of overcrowding are admitted by all who have studied the question; it is the chief social problem of the age, but I do not think it will be solved by erecting large blocks of buildings in the centres of industry, and crowding the poor together on the same area, only under better conditions. These blocks in twenty years' time may become slums by overcrowding unless the present high standard of maintenance and supervision is continued. One of the remedies I suggest for overcrowding is the erection of workmen's dwellings in the suburbs of our large towns, where the land can be obtained at a cheap rate. The land in Simnel-street cost the Corporation of Southampton 11,600*l.* per acre; it could be bought in the suburbs at one-fortieth of that cost. The architect, under such conditions, would have fair play, and he would be able to design healthy dwellings, which would let at a rent sufficient to cover the expenditure, including interest and the payment of the sinking fund. The only condition necessary to render this scheme a success is a tramway or light railway between the portion of the town where the workman earns his living and the suburbs where the houses referred to are built. It will pay a Local Authority in a large town to carry workmen to and fro on a tramway worked by electric traction, at one penny per journey the whole distance. The Corporation of Southampton carry workmen 2¾ miles in the early morning and in the evening by horse traction for one penny, and when the electric traction is completed the traffic will be a source of income to the Municipality.

But, it will be said, this tram service, cheap as it is, costs the workman one shilling per week at the least. That is so, but the saving in rent is more than sufficient to pay the cost of travelling, and in addition he has a garden where he can grow a few vegetables, and—what is most important—he gets purer air, and a more healthy home for his wife and family.

The middle class, and even the clerk, seek a home where there is 'more room to live'; and the crowds who flock into London in the morning by the suburban railways testify to the advantages of the system. Then why should the workman not do the same? The only reasons I know are—

1. Proper provision is not made by railway companies and Local Authorities to carry him at a low charge.

2. Many prefer, or are compelled, to live near their work.

Railway companies are forced by Parliament to provide for the workmen they displace when they seek powers to widen their lines or increase the areas of their stations; but why should they not be allowed to set apart land for the labouring classes in the suburbs, or build houses and include the railway fare in the rent, such rent not to exceed that paid in the houses they pull down?

The provision of workmen's buildings near the area of displacement is systematically evaded by the railway companies. They buy up insanitary areas or vacant land already laid out for workmen's dwellings, and so satisfy Parliamentary Committees, but these dwellings would have been erected without their assistance, so that there is actually no provision made by them to remedy the evil they have created.

The housing of the poor is at the bottom of many of our labour troubles. When a workman pays one-fourth to one-third of his earnings in rent and rates, can we wonder at his action when he agitates for better pay?

The price of labour is continually going up, and the cost of building houses follows; rents are increased, and every one suffers some indirect loss. May Parliament and Local Authorities take united action to eradicate this moral cancer which is paralysing our industries.

What we want in our large towns is expansion, and not concentration, in the interest of the public health, in the interest of temperance, and in the raising of the standard of morality and well-being of the people."

[Our report will be continued next week.]

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A WESTERN Counties' district meeting of the members of the Association of Municipal and County Engineers was held at Portland on Saturday, August 26. The members foregathered at the Royal Hotel, Weymouth, where the business proceedings of the meeting were transacted. Mr. W. Harpur presided, and among those present were Messrs. W. Weaver, Kensington; C. J. Lawson, Southgate; E. J. Elford, Portland; A. O. Harpur, Caerphilly; A. D. Greatorex, West Bromwich; T. H. Yabbicom, Bristol; D. Cameron, Exeter; J. Parker, Nottingham; J. Hall, Cheltenham, Hon. District Secretary; R. H. Dyer, Southampton; J. Lemon, Southampton; W. K. Armitage, Yeovil, and others.

Mr. J. Lano, Chairman of the Portland District Council, extended to the Association a hearty welcome to the Royal Manor of Portland. They were going to visit the Portland Waterworks, and he was sure they would be pleased with the skill with which that work had been planned and was being carried out by Mr. Elford. It was in great part due to Mr. Elford's enthusiasm that the waterworks were being carried out at Upway, because some of them had almost become discouraged by the failure of the previous scheme.

The Chairman, in acknowledgment, said their Association was one which aimed at giving information to their members, and their meetings, wherever held, were to the advantage of the town.

On the proposition of Mr. Yabbicom, Mr. Hall was re-elected Honorary District Secretary.

Water and Main Drainage Works, Portland.

Mr. E. J. Elford, Surveyor to the Urban District Council, read a paper on the new Portland water and main drainage works. He said that for many years the water question had been a cause of considerable worry to the Portland local authorities. In 1871 the Local Board, after persistent pressure from the Government departments, pledged themselves to provide a pure and adequate water supply and an efficient system of drainage, but though premiums were awarded, and the matter was continually under discussion, nothing further was done until 1889. In that year the matter was taken in hand most earnestly, and it was decided to sink a well near the village of Southwell. The work was commenced in 1891, and the shaft was sunk to a depth of 206 ft. The water was analysed from time to time with fairly satisfactory results. On May 17, 1895, a period of thirty-five days' continuous pumping from the well, to test the yield of water was completed, the average yield being at the rate of 116,000 gallons per twenty-four days. A sample of the water was forwarded to Dr. Frankland, analytical chemist to the Local Government Board, for analysis, and he reported that the sample contained a large proportion of sea water, mixed with land water containing a considerable amount of decomposed sewage. The result of the analysis created great disappointment and surprise, and as the works had already cost about 7,500*l.* the Council were placed in a very serious position. But in spite of the difficulties surrounding the situation they realised it to be their duty to provide the district with an efficient supply of water, and they decided to fulfil their obligations, whatever the cost might be. He strongly recommended the Council to abandon the scheme, and in October, 1895, he presented a report in which he recommended that no further attempt be made to obtain a supply of water from the island, where, in his opinion, owing to the limited area of gathering ground available, the imperfect sanitary condition of the district, and the open nature of the strata, it was impossible to obtain an adequate and pure supply. Eventually the Portland Council were approached by Captain Gould, R.E., a large landowner at Upway, who offered to sink a well and obtain a supply of water sufficient, both as regards quantity and quality, to meet the requirements of the Local Government Board on his estate at Upway. The well was duly sunk, and in February, 1896, water was found at a depth of about 20 ft. below the surface. On March 10 and 11 a test of twenty-four hours' continuous pumping was carried out, and resulted in a total yield exceeding 400,000 gallons. Thereupon the Council decided to take over the well, and with Captain Gould's consent to continue the sinking to a further depth of 6 ft. This additional sinking was completed, the yield at that time being at the rate of 750,000 gallons in the twenty-four hours. A sample of the water was sent to Dr. Frankland, who pronounced the water to be of excellent quality and above the average of chalk waters. On July 2 a letter was received from the Local Government Board requesting the Council to at once discontinue the test pumping and all other works connected with the well, and informing them that the Board would not sanction the borrowing of any money for the construction of waterworks to be supplied from the well "because of the possibility of contamination from the village churchyard." This churchyard had practically been in disuse for many years. It was situated at a distance of about 100 yards from the site of the well, and on the opposite side of a valley through which a stream of water flowed and on a bed of practically impervious soil about 10 ft. thick. The Council felt that it would no doubt

cause great delay, and would probably be useless to oppose the Local Government Board, and they therefore immediately entered into negotiations with Captain Gould to acquire another site upon which to sink a well. Ultimately a fresh site was agreed upon and sanctioned by the Local Government Board after three visits had been made by their inspectors. A loan of 500*l.* was obtained and a contract entered into with Messrs. B. Coode & Co., of London, for sinking the well and subsequently carrying out thirty days' test pumping. On the same day as that upon which the Council sealed this contract notices were published of the intention of the Weymouth Water Company to apply to Parliament in the ensuing session for powers to supply certain parts of Portland including the Government establishments. It appeared by the terms of these notices that the company were seeking powers to supply the low-lying and best paying portions of the island, leaving the Council with the obligation to supply the high-level districts, where the population was scattered and the revenue would be exceedingly small. The people of Portland, after the efforts they had made and the money they had spent in endeavouring to obtain a supply of water for the Government establishments and the inhabitants of the island, keenly resented this effort of a local monopoly to take from them their powers and privileges and render ineffective the endeavours they were making to put into operation the powers the legislature had conferred upon them. The Council unanimously decided to use every effort in opposition to the proposals of the Weymouth Company. In the meantime the well at Upway was sunk to a depth of 100 ft., and a 12 in. borehole to a farther depth of 70 ft. The test pumping was then proceeded with and resulted in an average yield of about 280,000 gallons per day, being 80,000 gallons in excess of the quantity required by the Local Government Board. A sample of the water was sent to Dr. Frankland, who reported that "this water possesses an extremely high degree of organic purity and is of the most excellent quality for dietetic use." The Weymouth Company's Bill passed its second reading in the House of Commons and was referred to Committee. The Committee stage lasted about three weeks. Unfortunately the Admiralty supported the Company, and in the end a compromise was effected under which the Company obtained powers to supply the Admiralty with a limited quantity of water for fifteen years; the Council to have the right to lay the mains required for this purpose, which would lie within their own district, and also the right to take the water from the Company at the boundary of their district and themselves supply it to the Admiralty. The Council were successful therefore in their endeavour to keep the Company outside the island, but their effort to keep out the Company's water entirely was only rewarded with partial success. He then proceeded to prepare his scheme in detail, and application was made to the Local Government Board for sanction to raise a loan of 37,500*l.* to construct the necessary works. In the meantime the Council had laid the pipe for the Admiralty supply from the Weymouth company, and also a considerable length of the 10-in. delivery main from Upway. The tender of Messrs. Bostel, Son, & Peattie, of London, for the completion of the works, amounting to 28,500*l.*, was accepted. The works were commenced on April 7 last year, and included the sinking of the well to an additional depth of 66 ft. and the driving of headings, the construction of the pumping station, buildings, and provision and installation of the machinery and boilers, the construction of the service reservoirs, and the provision and laying of about 20 miles of cast-iron pipes. The greatest difficulties had arisen in connexion with the work of sinking the well, and there had been many delays. The pumps had worked admirably and without a hitch since they were first started over four months ago, and by the beginning of July nearly 200 ft. of the headings had been driven out of the total length of 900 ft. provided for in the specification. At the completion of the additional sinking the total yield amounted to about 340,000 gallons a day. The total yield of the headings at the time of writing was 140,000 gallons, but as the yield of the shaft had decreased (owing to the dry season) to about 260,000 gallons, the total yield did not exceed about 400,000 gallons a day. The quantity of water which the Local Government Board required to be provided was 200,000 gallons per day, but he was of opinion that the Council, to be in a position to supply the present and probable future population of their district, and the needs of the Admiralty and other Government departments, allowing also a perfectly safe margin for contingencies, should, if possible, make provision for a supply of about 450,000 gallons per day. He had prepared a scheme for the drainage of Portland, and at the Local Government Board inquiry on May 26 last, Mr. Boulnois, Local Government Board Inspector, held an inquiry and expressed satisfaction with the scheme, but up to the present time no communication had been received from the Board. There could be no doubt as to what the decision of the Local Government Board would be after the expression of opinion from their inspector; and when the district was properly drained there was no reason why Portland should not gain as high a reputation as a health resort as it had in the naval world by means of its breakwater, especially as under the unfavourable conditions at present existing the average death-rate was only about twelve per thousand. The total cost of the scheme, including the renewal of all old sewers, was estimated at 24,000*l.* Unfortunately, the Council were not at the present time in a position to borrow this sum without so far increasing the total amount of outstanding loans as to exceed the limit of double the rateable value. They intended, therefore, to commence immediately the construction of the most urgent portions of the works, and in all probability by the time these were completed the amount of the present loans which would have been paid off, together with the increase in the rateable value, would be sufficient to enable them to borrow the sum necessary to complete the whole scheme.

Portland Stone.

Mr. Elford also contributed some notes on Portland stone, in which he described the various beds of stone found upon Portland, including bacon tier and aish, a stone of no commercial value; soft burr, a soft stone of very inferior quality; cap, a stone of a hard, close, and flinty texture, very difficult to work, and treated by the quarry merchants as a waste product; roach, a hard, tough, and somewhat silicious stone, composed principally of fossils united by a cement of carbonate of lime; whit bed, from which the best English stone for external work is obtained; and the base bed or white Portland. These expressions were both incorrect and misleading, and it had frequently happened that base bed stone had been supplied for work for which it was quite unsuited. This stone was whiter in colour, finer in grain, more absorbent and softer, and more easily worked, and had fewer shells than the whit bed. It was therefore unfit for exterior work, but was admirable for interiors and statuary. Unfortunately for the good name of Portland stone, large quantities were used for exterior work. It was in great demand by builders and contractors for practically every kind of work, as although it was higher in price, the expenditure for labour in working was so much less than for whit bed that a much higher rate of profit could be secured.

The Chairman proposed a vote of thanks to Mr. Elford for his papers. He said that in the first paper they had had a history of the troubles and difficulties which the District Council had met with in procuring a supply of water, but from what had been seen that morning they could say those difficulties had been mastered. They had now obtained a supply of water good in quality and excellent in quantity. He was particularly interested in the paper on Portland stone, because at the present time in Cardiff they were about to build a new Town Hall, on which they were going to spend a quarter of a million, and they had decided they would have Portland stone for their building. Now their troubles had commenced, because their architect told them if they were going to have Portland stone for their building there was such a demand for it they could not get their building erected in a reasonable time. He hoped the Portland people would find them a way out of their difficulties, and give them a guarantee that they would supply them with stone of proper quality and in sufficient quantity to keep their building going without delay. The particulars Mr. Elford had given as to the kinds of stone were extremely valuable.

Mr. Paton, Plymouth, said that they in the larger towns had had a much easier time than engineers to the smaller Authorities. A thing might be desirable in itself, and the public might agree that it was desirable, but the evil day was put off as long as possible owing to the cost that it would entail in carrying it out.

The vote of thanks having been agreed to, it was briefly acknowledged by Mr. Elford.

The members were entertained to luncheon at the Royal Hotel, Weymouth.

The members then drove to the waterworks, and inspected the well, pumping machinery, and reservoir, and to Portland, where the torpedo works and the workshops at Portland convict prison were inspected.

ENGINEERING SOCIETIES.

THE INSTITUTION OF JUNIOR ENGINEERS.—The summer meeting of this Institution has just taken place, the rendezvous being Portsmouth, with excursions to Southampton. Most of the party reached Portsmouth on Friday, August 11, and on the following day a trip round the Isle of Wight was made. On Monday, the Dockyard was visited, by permission of the Lords Commissioners of the Admiralty. In the morning the sections appertaining to the Chief Engineer, Mr. J. T. Corner, R.N., were seen, including the steam factory with engines for H.M.S. *Pandora*, under construction; hydraulic, steam, and atmospheric power installations; block-making machinery, &c. The torpedo school was also visited. The party then proceeded to the Town Hall, where they were received by the Mayor, Alderman T. Scott Foster, J.P., and entertained in the Banqueting Hall. The members were shown the ancient plate of the Corporation, and as much of the building as time would permit. They then returned to the dockyard to inspect its civil engineering features, and the shipbuilding; the former included docks, sliding caissons, emptying culverts, &c., under the direction of Lieut.-Colonel S. H. Exham, R.E., superintending engineer, whilst the battleship *London*, and third-class cruiser *Pandora*, afforded fine examples of the latter, the chief constructor of the yard being Mr. J. A. Yates. In the evening the Portsmouth Corporation Electricity Works were visited. New plant was being laid down to meet the increasing demand for current. The accounts for the year ended March 31 last, showed a credit balance on revenue of 9,650*l.* The total maximum supply demanded was 1,132 kilowatts; there were 261 public lamps, and the total quantity sold had been 1,224,949 units. On Tuesday morning the party boarded the gunboat, *Insolent*, which had been placed at their service by the authorities, and steamed from the tidal basin jetty in the dockyard to Nelson's *Victory*. Through special arrangements made by Flag-Captain F. C. B. Bridgeman, the historic vessel was examined in detail. The *Insolent* then took the members round the harbour for an inspection of the numerous war vessels which had recently returned from the Naval manœuvres. In the afternoon, the Southampton, Isle of Wight and South of England Royal Mail Steam Packet Company conveyed the party by one of their steamers from Southsea to West Cowes, and continuing the passage to the other side of the Medina, East Cowes was reached, and the works there belonging to the Liquid Fuel Engineering Company, were visited, under the guidance of Mr. Tousey. These works give employment to about 200 hands, the output capacity being equal to thirty "Lifu" steam wagons and twenty launches annually. The orders now being executed include four large tramcars for Toulon, France. After inspecting the works, some of the members were taken for a run in the harbour in one of the firm's steam-launches, the working and operation of the water-tube, petroleum-fired, boiler and high-speed engine, being thus demonstrated. Others had the opportunity of a drive by "Lifu" motor-cars past Osborne grounds to Whippingham and back. Crossing Spithead again, the members returned to Portsmouth in the evening. Wednesday's programme consisted of an excursion to Southampton. The members arrived at Southampton Docks at 10.15 a.m., and went for a run up the Test to Marchwood, and returning, steamed up the Itchen to Northam Bridge, this being arranged to enable the extent of the docks and character of the adjoining land to be understood. At the Prince of Wales quay the party disembarked, and after viewing the pumping machinery and new transit sheds, were met by the Mayor of Southampton, Councillor G. A. E. Hussey, and entertained by him to luncheon,

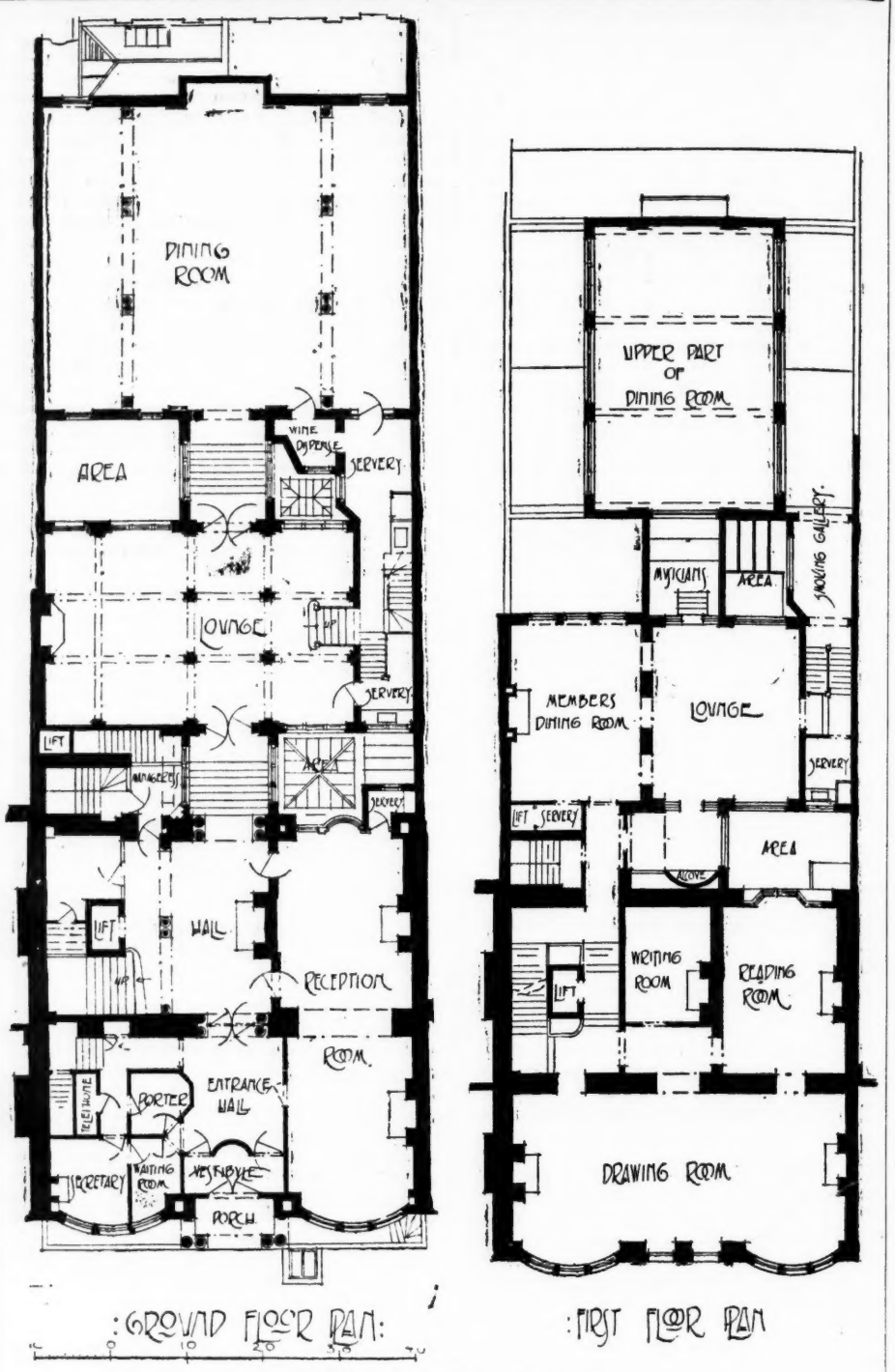
served in a shed on the extension. Subsequently the grain warehouses, the electric and hydraulic stations, &c., were seen, and the members were conveyed back to Portsmouth by special steamer *Albert Edward*. By the permission of her Commander, H.M.S. *Terrible* lying in dry dock at Portsmouth, was inspected on Thursday, gun drill being witnessed. Perhaps the greatest interest was concentrated in the engine and boiler rooms, the latter containing forty-eight Belleville boilers. A second day was devoted to Southampton on Friday, the journey from Portsmouth being by brakes viâ Netley, with a short stop there for a look at the Abbey ruins. In the afternoon the American liner *St. Louis* was inspected, under the guidance of Mr. Spence, Mr. Wilding, and the officers of the vessel. The party returned by train to Portsmouth. Here in the evening, at the Esplanade Hotel, the summer dinner was held. The President, Sir W. H. White, K.C.B., was, by his official engagements in London, prevented from attending as expected, and in his absence, Mr. Basil H. Joy, Chairman of the Institution, presided. The Secretary, Mr. Walter T. Dunn, was asked to accept from the members present a *repoussé* brass inkstand, in token of their appreciation of his exertions in so successfully organising and carrying through the arrangements of the meeting. Mr. Dunn having acknowledged the compliment, the proceedings shortly after terminated. On the invitation of Sir W. Pink, the sewage outfall works at Eastney were inspected on Saturday, August 19, the whole system and mode of operation being explained. The running sheds at Fratton, belonging to the South-Western Railway and the Brighton Company, were open to the visit of the members throughout the week, and the Clarence Pier was likewise open for their admission through the courtesy of the directors.

Illustrations.

PRUDENTIAL ASSURANCE COMPANY'S OFFICES, HOLBORN.

THE illustration which we publish this week is a reproduction of the drawing by Mr. A. Waterhouse, R.A., LL.D., of the buildings which he has designed for the Prudential Assurance Company in Holborn, and which are now under construction. It is many years ago that the original block, which shows on the left of the drawing, was completed, since which time, though the company have been busy in building branch offices in various parts of the country, and though their London premises have been increased by additions along Brooke-street and Greville-street, there has been nothing done to increase the frontage along Holborn. But the works which Messrs. A. Waterhouse & Son now have in hand involve the covering of the entire parallelogram bounded by Brooke-street, Greville-street, and Leather-lane, which has towards Holborn a frontage of 310 ft., and which occupies an area of 12,244 square yards. This space is naturally occupied, not by buildings only, but also by courtyards, the largest of which, corresponding more or less in position with the old courtyard of Wood's Hotel, comes in the centre of the site, and is entered from the new tower archway occupying approximately the position of the archway in the previous Holborn façade of Furnival's Inn, which in turn supplanted the older buildings of the Inn. This archway under the tower will be groined in terra-cotta and will provide in the future the main public entrance to the Prudential offices. It does not lead immediately into the large quadrangle, but conducts first into a narrower oblong courtyard separated from the larger court by a wide spanned granite arch carrying a corridor which prevents the east and west parts of the premises from being unduly separated. A third court, the eastern, lies on the Leather-lane side of the site, but the buildings come right up to the street frontage on every side.

Red Peterhead granite, red terra-cotta and red brick are the materials of which, outwardly, the offices are mainly composed. The inner walls are, in the principal public offices, lined with faience; in the secondary, with glazed bricks of various tints. Mr. J. C. Edwards, of Ruabon, is supplying the terra-cotta, while the glazed bricks are obtained from the Burmantofts Works of the Leeds Fireclay Company, who also supply the faience.



The Empress Club, Dover-street. Plans.

Some of the glazed bricks, principally for external use, have been obtained from the South Buckley Rock Brick Company.

Messrs. Holland & Hannen are the general contractors; the ironwork is by Messrs. A. Handyside & Co.; and the supervision of the work under the architects is conducted by Mr. George Bailey, the clerk of works of the Prudential Assurance Company.

EMPRESS CLUB, DOVER-STREET, W.

THIS building, No. 35, Dover-street, is now in course of reconstruction for occupation by the Empress Club, now located at No. 32.

The disposition of the building is such that the whole of the members' quarters is distinct from that to which guests can be admitted, what may be called the public portion of the club being kept on the ground floor, and this portion is arranged as follows:—

On the right of the entrance hall is a large reception-room. On the left in the front is the secretarial department and waiting-rooms. Passing through the staircase-hall and down a few steps, the lounge is reached, and beyond this again, a little lower still, is the large dining-room, lighted by a clearstory. These two last-mentioned rooms are lowered from the level of the front entrance on account of adjoining lights.

The first floor, or members' floor, contains a large drawing-room right across the front, measuring about 48 ft. by 22 ft., and also reading-room, writing-room, private dining-room, lounge, &c.

The basement is very roomy, extending over the whole site, and here are all the kitchens, with servants' offices, &c.

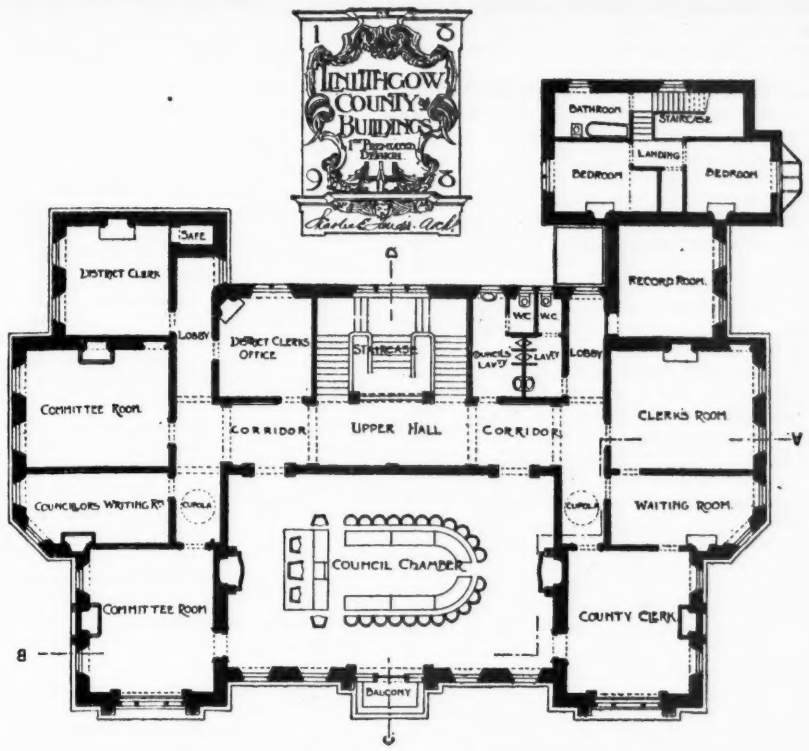
The whole of the building above the first floor consists of members' bedrooms, and an additional building of further bedroom accommodation is contemplated in the rear.

The new front, which we illustrate, is entirely of Portland stone, with two slightly projecting bay windows up to the second floor.

The builder is Mr. H. Lovatt, of Wolverhampton; the constructional steelwork is by Messrs. Moreland & Sons. The architects are Messrs. J. T. Wimperis & Arber.

LINLITHGOW COUNTY OFFICES.

THE design illustrated is the first premiated design for Linlithgow county offices. The competition was an open one, and some sixteen sets of designs were sent in. The buildings as illustrated are designed in the Georgian style, but having roofs of high pitch. The buildings are arranged on two floors, and are intended to be of fireproof construction. On the ground floor are the more public offices, viz., office for rates, weights and measures, and road surveyor's offices, also accommodation for Medical Officer of Health and District and



Linlithgow County Offices. Plans.

County Sanitary Inspectors. A caretaker's house is provided on this floor, with independent access to public road, and also having communication with the county offices.

The store for coals, the heating chamber, and workshop for Weights and Measures Department are on the basement floor.

On the first floor is the Council-chamber, 50 ft. by 30 ft., with two committee-rooms, one being in direct communication with the Council-chamber; there is also a writing room for County Councillors. The county clerk's offices are on this floor, conveniently arranged; also district clerk's offices, both these having safes.

Private cloak-room and lavatory accommodation has been provided for County Councillors, as well as for principals and staff. The cost will be from 8,000*l.* to 9,000*l.* The architect is Mr. Charles E. Tweedie, Edinburgh.

ST. MICHAEL'S CHURCH, BOURNEMOUTH.

THIS church, which is large and simple in design, was built by Mr. Norman Shaw some years since. The new tower, which has been designed by Mr. J. Oldrid Scott, stands on the south side in a position where it will be well seen from the Poole-road, bringing the church into greater prominence, while from more distant points of view it will add to the importance of the building, and break the long roof-line in a satisfactory way.

The materials will be similar to those used in the church. The total height will be about 128 ft., the cost being close on 5,000*l.* The contract is in the hands of Messrs. Bowman, of Stamford. J. O. S.

WINDOW, OLDBURY CHURCH, BRIDGNORTH.

THIS illustration is one of a complete set of stained glass windows in this church. The treatment is exceedingly light, the whole being executed in various white glasses, with the exception of one or two ticks of colour here and there. The whole of the series is the work of Mr. A. O. Hemming, of Margaret-street, W.

WINDOW, ST. LAWRENCE JEWRY.

THE illustration shows one of the four evangelist windows on the north side of the Church (St. Luke). The four scenes are parables from his gospel. The angels above are those rejoicing over the one sinner that repenteth. This window and that of St. Mark have been designed and executed by Mr. A. O. Hemming, of Margaret-street, W. The St. Matthew window is to be erected for the Lord Mayor's going in state on September 29 next.

MACHINE TOOLS.

AT the Engineering Conference of the Institution of Civil Engineers in June last, Mr. Arthur Greenwood, M.Inst.C.E., read the following paper, entitled, "Machine Tools: with special reference to American and German practice as compared with English":—

"In introducing this subject for discussion, the writer proposes to divide machine tools into four classes, namely:—

1. Planing machines, with which may be grouped shaping, slotting, and machines used for cutting straight surfaces of metals with knife-edged tools by reciprocating motion.

2. Lathes and boring machines, for cutting circular surfaces of metals with similar knife-edged tools.

3. Milling machines, for cutting straight or curvilinear surfaces of metals with circular rotary saw-like cutters.

4. Automatic machine tools, for special purposes.

It is upon the planing machine that the engineer relies as the basis in mechanical construction, the first requirement being a true flat surface; secondly, speed in obtaining that result; and, thirdly, economy in wear and tear and facility of maintenance in an efficient state. Strength and rigidity are the main factors in obtaining these results. These being assumed, there has to be considered what is the best form of bed surface, the best section of cross-slide, and the best driving-gear.

In the earliest planers, acute V-surfaces were used, doubtless to resist the strain of side-cuts and to take up the wear automatically. These V's, of from 60 deg. to 90 deg., have been gradually flattened, with beneficial results as regards scoring, until 140 deg. is a common practice; but all V's are difficult to make a good job in the first instance, and still more difficult to correct when by wear they become hollow or assume a 'wind.' The latest practice is to use flat surfaces with square or angular lips, and taking up slips to take the side strains. They much more easily effect a thoroughly good job in the first instance, as bed and table can be scraped to surface-plate independently, and are much more readily tested and readjusted when in use. The flat bed is gradually being adopted in England, and, to a less extent, in America and on the Continent; but even here the prejudice in favour of V beds dies hard. In some dozen large planers just completed or under construction by the writer's firm, V's have been specified by the purchasers in most cases, sometimes with a central flat surface; only in two or three cases have the makers been allowed to carry out their recommendation of flat surfaces alone.

The latest practice in cross-slides is the square lip on the upper side, certainly in America, and to some extent in this country, particularly for heavy machines. Much has been attempted in the past to make planers duplex in their action, either by reversing the tool or arranging the machine with two sets of uprights and cross-slides so as to cut in both directions; either method obviously can only be used with advantage in plain surface work, and both systems are seen more in England than in America or Germany. To economise time in running back, the Americans are leading the way by using very quick return of table up to and even beyond four times the cutting speed. This entails very perfect gearing and accurate reversing gear, friction clutches being often used; it absorbs, at any rate momentarily, a large amount of power, as those using electric driving can readily see by watching the ammeter.

For driving gear in this country, the screw is much in favour; it works smoothly and simplifies the gearing, but is not quite so economical in power as well-adjusted rack gearing. The Americans generally prefer rack gearing, and are obtaining splendid results with engine-cut fine-pitched gear. The compromise between the screw and the rack originated by Sellars in the States is largely used there, and has been followed by some English and German makers. Unless the gearing is very accurately pitched, there is a material in-

crease in the power used. The most economical planer for general work would appear to be the single-acting machine, with a very high speed of return, and a most accurate reversing gear easily adjusted whilst the machine is running, so as to reduce the idle time of the machine to a minimum.

Lathes.—In England the upright V, generally in conjunction with a flat, was originally used for lathe beds. Now, however, flat-surfaced beds with angular edges, or, as they are sometimes called, "gib" beds, are almost invariably used, being generally considered more robust and more readily kept in repair. The Americans, however, with one or two notable exceptions, adhere to the upright V, generally double, and this constitutes the leading difference between Eastern and Western lathes. The saddle mounted on the V's moves with less friction, but for heavy cuts this advantage is lost, as the saddle must be weighted or retained by a lip to prevent the cutting-tool running in.

As regards headstock and spindle, the parallel neck is more used in the States than in this country, where conical necks are generally used for small lathes and parallel ones for the heavier ones. Cones and belts for traverse gear are now being generally discarded in favour of direct gearing, both in England and in the States; and the lathe headstock of the future, with a variable speeded electric motor combined, will soon see the end of belt driving, at any rate so far as lathes are concerned. In lathes generally, the Germans follow more closely the English than the American type.

Before leaving lathes, one must remark the very general adoption, particularly in America, of the horizontal face-lathe or boring mill, which offers facilities both for speed and accuracy. Turret lathes may be grouped with automatic machinery.

Milling.—This is one of the earliest known ways of cutting metal, doubtless temporarily eclipsed by the development of planers and tools under Class 1. Both in America and in this country manufacturers of articles where great repetition occurs, such as rifles, sewing and some textile machinery, have used milling for the past forty or fifty years, and the development of this system of cutting metal, as seen in the modern universal miller in a well-equipped tool-room, leaves little to be desired for rapidity, accuracy, and general adaptability. During the past fifteen years milling machines have been largely introduced for heavy work, notably for locomotive and engine builders, and in this direction English makers have certainly been to the fore. Some of the Continental makers have carried milling to questionable lengths, particularly in France, where one has seen work being milled which might have been more advantageously done on planing machines. In England and America, and in France, vertical millers are principally used for plain and curvilinear work. Many are also made on the planing machine type with either horizontal or vertical spindles, or both. This is an excellent type of machine, particularly for straight work. The Germans often go to the length of combining this type of machine with a planer, but as a rule combination machines are to be avoided.

Automatic Machinery for special purposes is now coming very much to the front, chiefly in America, but both this country and Germany are moving in the same direction. Where great repetition of parts is required, there can be no doubt of its advantage. A general type of machine is a hollow spindle lathe with automatic feed and chuck for the material to be operated upon, a saddle with turret rest, back and front transverse slides, all driven automatically from a cam shaft. This machine will produce studs, screws, bolts, and other analogous work from the solid metal bar. By using special chucks, wheels, pulleys, cylinder-covers, and other parts of engines or machinery may be finished at one fixing, as against innumerable chuckings in the ordinary boring and turning lathes. The advantages claimed for this system are that a comparatively unskilled operator may attend to a number of machines, the tools and tool adjustment being controlled by a skilled mechanic. The enormous advantage of this system of manufacture must not be sacrificed by attempting to do too much, and discrimination is required to see that work which can be better done by separate operations is not attempted on this class of tool. In turning work from the bar—such as studs, bolts, &c.—care must be taken that the advantages gained by saving of labour is not lost by waste of material; and articles having large differences in diameter may often be advantageously forged and finished in other types of automatic or other lathes,

Now that the gearing of nearly all machine tools is engine-cut, automatic gear-cutters are largely used. One attendant serves quite a number of machines.

In machine tools generally, with some recent exceptions, the Germans have followed pretty closely the English lines, but have produced cheaper and lighter tools, and have lacked in originality. The Americans, on the other hand, have struck out on lines of their own, based on those of the earlier English makers. They are generally well made, convenient to manipulate, but of lighter construction, and have not the endurance of the English tools.

The English tool-makers for a long time were practically the makers for the world. For strength, stability, and downright wearing capacity, they still hold the first place; the one reproach that may be made against them is their comparative slowness in producing tools required to meet the growing and changing requirements of the trade, which gives the Americans a certain pre-eminence. Probably one of the reasons is that here tool-makers attempt too many varieties. Nearly every maker produces all the various classes, whilst in America they generally confine themselves to one. Whether this is arrived at by mutual arrangement, or is the result of their practical nature, the result is satisfactory in producing machine tools of standard sizes suited to the requirements of the hour, and, by reason of this standardisation, at an economical cost."

COMPETITIONS.

NEW MARKET HALL FOR LEEDS.—Some time ago the Leeds Markets Committee invited architects to send in designs, plans, and estimates for the erection of a new Market Hall on the site of the present structure in Vicar-lane. In response to the advertisement a number of plans were received. These were submitted to the President of the Royal Institute of British Architects for his report and adjudication. Mr. Emerson has now sent his report containing his awards. This document was read at a meeting on the 29th ult. of the Markets Committee, who, after inspecting the plans, confirmed the decision of the assessor. The first design is estimated to cost 73,000*l.* The second plan would require 55,000*l.*, and the third 43,000*l.* The committee much preferred the first one, but have resolved to request the architect to reduce the estimate by 15,000*l.* or 20,000*l.*

BOOKS RECEIVED.

THE EMPLOYERS' LIABILITY ACT, 1880, AND THE WORKMEN'S COMPENSATION ACT, 1897. By A. H. Ruegg, Q.C. Fourth Edition. (Butterworth & Co., London.)

THE PRINCIPLES AND PRACTICE OF TIMBER MEASURING AND VALUING. By Tom Bright. ("Land Agents' Record," Limited, Strand.)

Correspondence.

To the Editor of THE BUILDER.

THE ALDERSHOT MASONIC HALL COMPETITION.

SIR,—On my return to town after an absence of three weeks, my attention has been called to two letters in your issues of August 19 and 26 respectively, with regard to the non-award of a second premium in this competition. Having acted as assessor, I would ask you in reply to publish the following extract from my report to the company, dated July 29. After dealing with the merits of the selected design, I then go on to say as follows:—

"Of the remaining designs only two—'Red Star' (mark) and 'Mother Lodge'—call for commendation, and these only in respect to the architectural rendering of their front elevations. I am unable to accord a second premium, as no one design shows sufficient superiority among, say, the next six best as to merit this distinction. In fact, no single one of the remaining designs shows such practical and economical planning on the lines you suggested combined with a suitable architectural rendering as to call for such an award. I would hence recommend that the second premium of 10*l.* be divided into two 5*l.* consolation premiums, and be awarded to the authors of the two designs that I have recommended, in recognition of the trouble expended on the design of the elevations."

It will thus be seen that I thought it only fair that the value of the second premium should be divided between the most meritorious of the competitors, as it could not be justly awarded to any single one of them. I am now pleased to be able to inform you that the directors of the company, at their meeting of yesterday, decided to leave this matter in my hands to be dealt with as suggested, or in any other manner which I might deem right and fair as between and to all the competitors. Hence, as I uphold my recommendation that the second premium be divided in the form of two compensation premiums, the design "Red Star" (mark) and "Mother Lodge" will be the recipients.

There was no question, as one of your correspondents suggests, of the whole of the remaining designs being of equal value to my mind, nor any question of withholding the value of the second premium. If anything, there could only have been the question of distributing doles of 13s. 4d. each among the unsuccessful competitors. As to any delay in the matter, I am afraid I must plead the indulgence of absence abroad.

August 30. EDWIN O. SACHS.

ROYAL INFIRMARY, NEWCASTLE-ON-TYNE.

SIR,—Just a few lines in answer to one or two remarks made by Mr. Henman in his letter appearing in the *Builder* of August 19. Your quotation "who shall decide when doctors disagree" did not (as might be inferred from Mr. Henman's letter) refer to the decision arrived at, as to the merits of the plans submitted, but was only in reference to the various schemes of ventilation advocated. There was an unanimous decision of the assessor (Mr. Alfred Waterhouse) and the entire committee as to our plans being placed first. With reference to the ventilation, it seems a weak admission that so strong an advocate of the plenum system as Mr. Henman should not have had the strength of his convictions to recommend it. It is interesting to note that the authors of the second premiated design (Messrs. Milner Allen & Simpson) favoured the plenum system in their report, and quoted the Birmingham Hospital in support of it. It would seem from Mr. Henman's letter that our design did not strictly adhere to the conditions of the competition issued to competitors, whereas every condition was most rigidly adhered to. Mr. Henman in his letter gives part of the conditions, but not all. The conditions certainly asked for four wards of twenty-two beds and two wards of twenty-four beds on the medical side, but the conditions also state—"The exact distribution indicated will not be insisted upon if the total number of beds in each department is provided for"; and again, "designs must embody generally the accommodation set forth in the schedule, but any slight deviations therefrom will not involve the rejection of the design." We chose rather to give good wards of twenty-four beds than badly-designed ones of twenty-two beds, and we provided the total number of beds in each department demanded.

The other discrepancies which Mr. Henman alludes to, but does not specify, we are unaware of, and therefore unable to answer.

With regard to the out-patient department, Mr. Henman says that the external corridor was purposely not adopted because when provided it is found to be not only unnecessary but absolutely misleading to patients and staff, and in proof of this he quotes the newly-erected infirmary at Bedford, designed by Mr. H. Percy Adams. As this was news to Mr. Adams, he at once wrote to the Chairman of the Committee of the hospital making inquiries, and received his answer that the out-patient department is quite satisfactory. A little difficulty was experienced at the opening owing to the "way-in" and "way-out" doors not being labelled; this was, of course, easily remedied, and everything works smoothly. Surely it is a little rash to try and condemn a principle of planning that has been working very satisfactorily in several hospitals for years! The intelligence of an out-patient must indeed be feeble which cannot grasp the intricacies of a straight corridor. If Mr. Henman was so anxious to keep to the letter of the conditions, how was it that he ignored them when designing his out-patient department, as an external corridor is certainly implied and was followed by the first three premiated competitors? It says "Each consulting-room be adjacent to two examination-rooms and *have egress to the passage leading to the dispensary waiting-room.*"

H. PERCY ADAMS, W. LISTER NEWCOMBE } Joint architects to the Newcastle Royal Infirmary.

ROOFS IN SUMMER AND IN WINTER.

SIR,—Will some one amongst your readers give me their advice upon the following difficulty?

My house, a rectory, is a somewhat large one, containing but one story and with a slate roof of very short pitch, leaving but little space between the slates and the ceilings of bedrooms, between which there is neither felting nor boarding. The consequence is that in the summer we are simply "baked," and in the winter almost "frozen."

To make the span of the roof deeper, and board and felt it underneath the slates, as one builder has suggested, is far beyond the reach of my purse.

To whitewash it is of very little help and not permanent. Would a kind of canvas framework from the ridge to gutter with, say, 6 to 8 in. space between, be effective and inexpensive?

The disadvantage of this would be that it might answer in summer, but not in winter.

B. M. R.

The Student's Column.

ROADS: THEIR CONSTRUCTION AND MAINTENANCE.

PART I.—MATERIALS (*Continued*).

10.—WOOD.

No account of road-making materials would be complete without some reference being made to wood, the use of which is rapidly increasing for town pavements, chiefly on account of its freedom from noise and from the excessive slipperiness of asphalte. Wood has, indeed, been in use for at least fifty years in the metropolis; but it is only in comparatively recent years that more extended knowledge of its behaviour and the conditions of wear of various kinds of timber have enabled a proper selection to be made of suitable varieties for this purpose.

All woods adapted for paving blocks belong to the class known to botanists as *exogens*, or outward growers; by which it is meant that the timber increases annually in growth by the deposition of successive layers of woody tissue on the outside, just beneath the bark. The bark likewise thickens on the under side at the same time. To understand properly the causes of the difference in woods it is necessary to sketch briefly the mode of growth of an ordinary exogenous tree. The primary element of all plants is the cell, which in its normal form is a more or less globular sac composed of cellulose and filled with a protoplasmic fluid. By the increase and union of these cells, cellular tissue or parenchyma is formed, in the midst of which hollow spaces termed lacunæ are often developed. Communication between the cells is freely carried on by the passage of fluid through the thin cell-walls. By continual growth the cells gradually elongate, the walls become thickened by deposition of lignine, and the cell itself tends to become filled up so that the passage of fluid is no longer possible. Thus woody or ligneous tissue is formed. Rows of cells also unite into continuous tubes by the absorption of the intervening cell-walls, forming *vessels*, which by their union assist in forming woody bundles. Since these changes are developed by age and the newer cells are always formed on the outside of the tree stem, it follows that the cells nearest the centre of the stem are the oldest and most completely converted into woody tissue. Thus we distinguish two distinct parts in timber, the *duramen* or heart-wood, consisting of the hardened layers in the centre, and the *alburnum* or sap-wood, the softer wood near the margin, in which the cell-walls are still only partially thickened by lignine.

A transverse section of a tree stem will generally show these parts clearly, owing to a difference in the appearance of the older and more indurated heartwood. If wood is felled at too young an age, it will be deficient in heartwood; and if too old, the heartwood will begin to show traces of decay.

The quality of wood is also influenced by the rapidity of its formation, as indicated by the rings of growth visible on a cut section. These annual layers are most distinct in trees which have grown in temperate climates, where there has been a period of repose in winter. A cold, inclement summer will leave its record in a narrower ring of growth. Soft-wooded trees grow most rapidly; while closeness of the rings indicates slow growth, and is a sign of strength. For this reason the more northern pines are more compact than those which have grown further south in warmer climates. The rings of growth are traversed by lines of cells radiating from the pith, termed medullary rays. These are the last to become hardened by the development of lignine, and maintain a connexion between the pith and the bark during growth. They are scarcely visible in the conifers, in which they consist of only one row of cells; but are more conspicuous in some of the harder woods. We have said that the passage from the soft cellular tissue to the harder woody tissue is marked by an elongation of the cells and the deposition of lignine upon their walls. This change results in the formation of long spindle-shaped pointed cells, the pointed ends of which insert themselves between the cells of the same kind lying above and below them. Thus is produced the fibrous structure of wood upon which its strength chiefly depends. The disposition of these fibres forms the grain of the wood, which usually runs parallel with the axis of the stem.

If we examine carefully the causes of the difference in the woods of various trees, we find them to be due to the following structural peculiarities:—

1. The existence of vessels, which by their union form vascular bundles. In the conifers these are absent, but in most hard woods they occur and sometimes form conspicuous pores in woods of coarse grain.

2. The disposition, length, and size of the medullary rays, which in some woods form what carpenters call the *silver grain*.

3. The presence of cells or lacunæ containing resin, occurring abundantly in most conifers.

4. The presence of a woody parenchyma containing starch or analogous products.

The hardness and weight of woods depend upon the structure and development of the tissues, the induration of the cells, the number of vessels, and the presence of woody parenchyma. In the soft woods, of which pine and deal are examples, there are not only a large number of resinous lacunæ, but each ring of growth consists of two portions, one being hard and dark, while the other remains soft and light-coloured.

Many different kinds of wood have been used for paving-blocks, amongst which the soft woods are chiefly represented by Baltic firs of various descriptions, such as Swedish yellow deal, Wyborg red deal, Memel fir, Norway spruce fir. French pine from the Landes, and pitch pine from Florida has also been used, the last-named being considered by some to be especially durable. In America, cedar has been largely used, and in the Southern States the cypress, juniper, cottonwood, and mesquite.

The hard woods, like the harder varieties of stone, are more slippery, especially when wet. Oak and beech have been tried as well as elm, but the latter is not durable. Teak from Java, bois de fer from Borneo, and liem from Annam have been used in France; but at the present time the Australian blue-gums, jarrah and karri are considered most suitable, not only on account of their durability under natural conditions, without any soaking in creosote or other solutions, but also on account of their closeness of grain and small absorptive tendency. This latter property is not only important on sanitary grounds, but also on account of the smaller amount of expansion which the blocks undergo when wet.

In the selection of paving-blocks care should be exercised. It is not considered necessary that the wood should be seasoned, a little "life" being considered advantageous. It should be close-grained and as homogeneous as possible to secure even and uniform wear. All sapwood should be removed, and blocks with imperfections, such as shakes and knots, should be rejected.

In shape the blocks should be rectangular. In the United States cylindrical cedar blocks have been extensively used, whole sections of the tree stem, with the sapwood cut off, being preferred, on account of the tendency of the wood to split when cut to rectangular shapes. Hexagonal shapes have also been used in the form of truncated hexagonal pyramids, the top section being slightly smaller than the base. In this country rectangular blocks are preferred. In length they may be from 8 to 12 in., and in width from 3 to 5 in. The narrow blocks are better, giving better foothold when damp, and retaining a more even surface under wear. As regards the depth of blocks, the present tendency is to make this considerably less than was the practice formerly. This is more especially the case with the Australian hard woods. It is contended that the foundation of a road carries the traffic, and that the superficial covering merely acts as a skin to preserve it. Wood blocks must be renewed when worn to the depth of 2 in. or 2½ in., and to lay down blocks 8 in. in depth represents simply a waste of material. A depth of 5 in. is enough for most woods, and in the case of karri or jarrah even 3½ in. may be enough. The blocks should in all cases be cut so that they can be laid with the fibre quite vertical. The importance of this point has been demonstrated by experiment, in which the following results were obtained:—

Angle of Inclination of the Fibre.	Amount of Wear.
Vertical fibre	·125 inch
75 deg.	·147 „
60 „	·182 „
45 „	·250 „
30 „	·310 „
15 „	·375 „
Horizontal fibre	·500 „

The reason for this is obvious from what has already been stated as to the manner of growth of the woody tissue, the elongated fusiform cells interlacing in the direction of the grain, so as to give the greatest resistance to transverse stresses on the tree stem.

Wood has many advantages as a paving material. It is more noiseless and safer than asphalte or granite, and although traction is not so easy it gives better foothold. It also possesses the advantage of inflicting less injury upon a fallen horse, and affords greater facility in rising again. It possesses also considerable elasticity, causing less wear and tear on vehicles, and is pleasant to travel upon. It may be used even on moderately high gradients, such as 1 in 20, and its first cost is less than stone of the better class. It is also easily repaired, and has a good appearance.

On the other hand, its absorptive power, especially when the soft woods are used, is, from a sanitary point of view, a great disadvantage. Saturation with street refuse, and the adherence of dirt, which is not readily removed by cleansing, is liable to produce smell and propagate disease. This evil is, of course, diminished by the use of harder woods, or by creosoting the softer kinds. Wood is also very susceptible to the influence of water. It not only expands, but also becomes slippery when wet. Expansion is greatest in soft woods, and may amount to 1¼ in. in 8 ft. This property gave considerable trouble in the early wood pavements, the expansion causing damage to kerbs, lamp-posts, and gullies.

Preservation of Wood.—Natural decay takes place in wood from various causes, amongst which may be mentioned the action of absorbed water, fermentation of the albumenoids of the sap, and the attacks of insects. Even in the growing tree wet rot may result from saturation by rain, causing putrefactive fermentation of the substance of the wood. Dry rot, on the other hand, is caused by the growth of a fungus, which gradually eats its way into the wood, gradually reducing the fibres to powder and destroying its cohesion. Dry rot is caused by exposure to warm, damp, stagnant air, and often exists in an incipient stage in imported timber, owing to insufficient ventilation when stacked improperly. Several methods have been devised to prevent the decay of wood from these causes. These consist in impregnating the wood with creosote or with various metallic salts. There is considerable difference of opinion as to the value of creosoting as a preservative. Some maintain that the life of the timber is materially increased thereby, inasmuch as the creosote coagulates the albumen of the wood, and thus arrests the tendency to fermentation and decay; at the same time, the heavier portions of the creosote fill up the pores of the wood, and thus diminish its permeability. Insects and fungi are also destroyed by it, and incipient dry rot is thus arrested. There is no doubt that the efficiency of creosote as a preservative is determined partly by its composition and partly by the manner in which it is applied.

Creosote is derived both from wood tar and from coal tar, the latter alone being used for the treatment of timber on a large scale. Coal tar creosote differs in composition with the nature of the coal from which it is derived. The London make of creosote, obtained from the gas tar from Newcastle coal, is rich in heavy oils, being highly charged with naphthalene, and is often viscid or even semi-solid at ordinary temperatures. Coals from the Midlands furnish a creosote which is lighter and has a larger proportion of volatile matter. This is known as Midland or "country creosote." Scotch creosote, derived from cannel coals, is still thinner and more volatile, being often lighter than water, the specific gravity of the heavy London oil being sometimes as high as

1·10. Bone oils and mineral oils, occasionally used in the place of coal tar creosote, have no antiseptic value; and the addition of crude tar to creosote oils is injurious, not only on account of the large proportion of light, volatile oils in the tar, but also on account of the presence of pitch, which clogs the pores and prevents the penetration of the creosote into the fibres of the wood. On no account should creosote contain any traces of ammoniacal liquor, which acts as a solvent upon ligno-cellulose and destroys the woody tissue.

With regard to the kind of creosote most suitable for the antiseptic treatment of timber, the heavy London make is usually preferred; for although the lighter "country" oils contain more carbolic and cresylic acids, it is held that these have no permanent value on account of their volatility and solubility, as well as owing to the fact that these acids do not form any permanent combination either with albumen or with woody tissue. The heavy creosote oil contains a larger proportion of the basic bodies, of which acridine and naphthalene play an important part in the preservation of the wood, and some of which becomes solid within the pores after the creosote has cooled to the temperature of the air. The solidification of naphthalene may be observed in the glistening scales usually to be seen on wood after creosoting. Dr. Tidey's specification for creosote is now generally adopted. It provides (1) that the creosote should be entirely liquid at 100 deg. F., no deposition taking place until the temperature falls below 95 deg. F.; (2) that not less than 25 per cent. should remain undistilled at a tempearture of 600 deg. F.; (3) that 8 per cent. of tar acids should be present.

So much for the nature of the creosote. We have now to see how it should be applied. It is obviously impossible for wood to absorb the oil if its pores are already filled with air or moisture. In Bethell's process the wood is placed in an air-tight cylinder which is then exhausted by an air-pump until the pressure is not more than $\frac{1}{3}$ or $\frac{1}{4}$ of an atmosphere. Creosote oil is then admitted at a temperature of 120 deg. F., and forced into the pores by a pressure pump, the air having been withdrawn from the wood in consequence of the partial vacuum produced by the air-pumps.

This process is not suitable for fresh cut timber containing moisture in the form of sap, which would thus be imprisoned within the wood. Blythe's process, which has been largely adopted in France, is an attempt to overcome the difficulty of the presence of moisture in the wood by forcing in the creosote by means of a steam injector, whereby the oil is partly vaporised. The objection to this process is that creosote cannot be completely vaporised except at a temperature which would be injurious to the wood. It is usual, therefore, to supplement the action of the steam by the subsequent injection of liquid creosote as in Bethell's process.

The most effective way of dealing with the moisture in wood is by Boulton's process, in which the creosote is raised to the temperature of about 220 deg. F. before injection by the pressure pump, as in Bethell's process. The heat of the oil thus vaporises the moisture in the wood and enables the exhaust pump to withdraw it completely. This method is superior to those described above for young timber containing much sap; for to subject such wood to the creosoting process without withdrawing the moisture would seriously impair its durability, owing to the sealing up of the pores near the surface.

The open tank process of creosoting is useless. If the process is not continued for some weeks, and the oil kept at a high temperature, merely soaking the timber only results in a very limited penetration.

The amount of creosote which can be absorbed by wood varies with its age and quality. Sapwood is more absorptive than heartwood, and soft woods can take up more than those of a harder description. Fir absorbs from 10 lbs. to 12 lbs. per cubic foot, beech takes up 24 lbs., red pine 15 lbs., but oak not more than 6 lbs. It is stated that sapwood, when thoroughly saturated with creosote, is more durable than heartwood which has not been subjected to this process, in which case the removal of the sapwood is not advisable in creosoted timber. It is contended, on the other hand, that, although creosoting may prevent natural decay, it does not affect the wearing qualities of the wood. When used for pavements all wood is liable to wear before natural decay sets in, especially under heavy traffic. With lighter traffic the case may be otherwise, and the use of a preservative more economical. It is simply a question of the extra cost of creosoting or a more frequent renewal of the pavement. In any case it is only the soft woods that need be subjected to this treatment.

Timber should be properly inspected before creosoting. Its quality and the presence of defects are not so readily seen afterwards. The thorough penetration of the creosote should be ascertained by cutting a few blocks in half. There are other methods of preserving wood, but for paving blocks these are not considered advantageous. In principle, they consist in impregnating the wood with various metallic solutions, such as the soluble salts of mercury, copper, zinc, or iron.

GENERAL BUILDING NEWS.

BAPTIST CHAPEL, MAESTEG, GLAMORGANSHIRE.—A new Baptist chapel was recently opened at Maesteg. The chapel is built of local stone with Forest of Dean stone dressings, and the roofing is of copper-coloured Carnarvon slates. The cost was about 1,400*l.* The contractor was Mr. D. J. Davies, Blaengarw, and the architect, Mr. W. W. Williams, Swansea.

BAPTIST CHAPEL, WEST NORWOOD.—It is proposed to build a Baptist chapel in Gipsy-road, West Norwood. The architect is Mr. Hampden W. Pratt, and the contract has been let to Messrs. J. Wall & Co.

CHURCH TOWER, WALTON, ESSEX.—A tower has been added to Walton Church. Messrs. Brown & Burgess, of Ipswich, were the architects, and the builder was Mr. Harry J. Linzell, of Ipswich and Felixstowe. The tower, which is Perpendicular in style, is faced with split Bramford flints, with Portland stone dressings. The tower is built upon the foundations of a former church, and inside there is a circular staircase leading to the belfry. The new porch is paved with York stone and tile.

DECORATION OF ST. LUKE'S CHURCH, LIVERPOOL.—The decoration of the interior of St. Luke's Church, Liverpool, is now completed. The principal colours used in the nave and aisles are two shades of green and cream, red being introduced for the principal lines of the building. The small patera in the hollows of piers and arches are also in red. On the walls of the aisles, above the springing, and at the west end of the nave, there is a stencil pattern in green and yellow. Gold has been used in the nave and chancel. The church has been fitted throughout with electric light. The work was executed by Messrs. Wannop & Sons from the designs and under the superintendence of Professor Simpson, of Liverpool.

VILLAGE SCHOOLS, PARK STREET, HERTFORDSHIRE.—New mixed schools are being erected on a site in Branch-road, Park-street, from plans prepared by Mr. Frederick Waller, of London. The work is being executed by Messrs. Boff Brothers for the contract price of 1,555*l.*

BOARD SCHOOL, OCKER HILL, STAFFS.—A block of Board schools is being erected at Ocker Hill, Tipton. The foundation stone was laid on the 28th ult. The buildings will consist of a mixed department, infants' department, and a caretaker's house. Accommodation will be provided for 600 children. The architect is Mr. A. Long, and the builders are Messrs. J. H. Whittaker & Co., of Dudley, their contract price being 6,000*l.*

SCHOOLS, BURTONWOOD, LANCS.—New schools have been erected at Burtonwood, near St. Helens, by the Burtonwood School Board. The plans of the new buildings were prepared by Mr. Thomas Beesley, architect, Warrington, and the contract for their erection was given to Mr. James Pilkington, of Rainford, who has carried out the work at a cost of about 2,000*l.*

BRUTON GIRLS' SCHOOL.—A site for this school has now been obtained on the main road in the direction of Cole, and building operations have already commenced. Plans, &c., have been prepared by Mr. Arthur J. Pictor, architect, of Bruton, and the contract has been secured by Mr. T. S. Hobbs, builder, of the same town.

NEW BOARD SCHOOLS AT WALSALL. — New Board Schools which have been built on a site at Whitehall, Walsall, were opened a few days ago. The schools will accommodate 1,070 children, 390 boys, 330 girls, and 350 infants. Over the boys' corridor at the north end of the block rises a bell tower, and the total height to the top of the vane is 70 ft. The materials used are local bricks with Leicestershire bricks for facings, and red moulded bricks and terra cotta for dressings. The rooms have a dado of cream-coloured glazed bricks, the floors are laid with wood blocks and the corridors and passages with granolithic cement, and all the joinings and fittings are red deal stained and varnished. The heating of the rooms will be by hot water on the low-pressure system. The total cost of the schools was 8,500*l.* The building works were carried out by Mr. W. Wistance, contractor, of Walsall, from designs by Messrs. Bailey & McConnal, architects, Walsall.

REBUILDING OF MANSION HOUSE, ABERDEENSHIRE.—Glenkindie House, Donside, Aberdeenshire, which is the property of Captain Leith, is to be rebuilt on an enlarged scale at a cost of about 14,000*l.* The architects are Messrs. Sydney Mitchell & Wilson, Edinburgh. The new buildings will be chiefly of freestone. Mr. Edgar Gauld, Aberdeen, has obtained the contract for the mason work; Messrs. McRobbie & Milne, Aberdeen, that for the joinery work; and Messrs. James Bannochie & Sons, Aberdeen, that for the plastering work.

THE PATENT OFFICE LIBRARY.—Good progress is being made with the new buildings, designed in the Office of Works. Messrs. Perry & Co.'s contract price is 43,581*l.*, exclusively of heating, wood-block flooring, fittings, electric lighting, plastering, &c.; and the contract time is January 15, 1901. The inner or new library block, measuring internally 139 ft. 3 in. by 59 ft. 6 in., and covering most of the site of the former building, consists of a ground floor with a lower and an upper gallery (at the sides and ends) supported by cast-iron fluted columns with Corinthian capitals. Above the vestibule, at the west end, is the arbitration-room, and next westwards is the principal staircase. A new block of offices for the general staff is being built along the south side of Southampton-buildings, having a frontage 130 ft. 3 in. in length, and consisting of four floors and a basement, with kitchen, mess-room, &c., in a portion of the top floor. The façade, of white brick and Portland stone, corresponds with that of the adjoining buildings, formerly Nos. 12-13, Staple Inn, on the terrace along the south side of the Inn garden, opposite the Hall, which were built in 1842-3, after Wigg & Pownall's designs, for the Taxing Masters in Chancery, in a Jacobean style, of which there are very few examples of any magnitude in London. Wigg & Pownall's elevation was somewhat modified lately—the two entrances being converted into rooms, and the frontals changed, whilst their general scheme was followed by Sir John Taylor (lately of the Office of Works) in his extension of the block eastwards (1894-5) on the site of No. 11, Staple Inn, as rebuilt in 1699. The block now being erected will have an entrance in the middle, and will communicate with another block extending southwards to Quality-court where, it seems, will remain the stone front consisting of a rusticated ground floor with an upper story of four fluted Roman Doric columns half-engaged and an angle pediment—being the only surviving portion of the old offices, ascribed, as we have already stated,* to Sir William Chambers, and in that case to be reckoned amongst the last of his works, for he died in 1796. The new buildings will be "fire-proofed" by Messrs. Homan & Rodgers with their concrete and steel construction in the library, its galleries, and ground floor, and by the contractors in the rest of the fabric.

NEW THEATRE, DUDLEY, NEAR BIRMINGHAM.—Dudley's new theatre, to be know as the "Dudley" Opera House, is nearly completed. The theatre has been built to the plans of Mr. A. Ramsell, architect, of Dudley. It is Italian Renaissance in style, with a frontage of 150 ft., and a height, from the ground level to the symbolic figure on the apex of the façade, of 66 ft. It is brick-built, with terra-cotta dressings, and will seat 2,000 persons. The stage is 72 ft. 6 in. wide, its depth (from the footlights to the back wall) 36 ft., and the height, from the floor-line to the "gridiron" 50 ft. The distance from the footlights to the last row of the gallery is 78 ft., whilst the height from the pit floor to the dome in the ceiling is 41 ft. The auditorium ceiling is designed in relief, with the centre dome painted with sky effect, and the fronts of the dress circle and amphitheatre are in keeping, the prevailing colours being cream and gold. The whole of the building will be lighted by electricity.

THEATRE, ROTHERHITHE. — A theatre, to be known as "Terriss's," is now in course of erection in Lower-road, Rotherhithe. The front of the building is being executed in red brick faced with Bath stone. The stage will be 30 ft. across, and 72 ft. from the footlights to the rear. The proscenium will be 30 ft. in height. The theatre will hold nearly 4,000 persons, including 1,500 in the gallery. The electric light is being installed by Messrs. Strode, who are also carrying out the engineering work. The cost of the whole is estimated at 25,000*l.* The architect is Mr. W. G. R. Sprague, and the builders are Messrs. Walter Wallis & Co.

MISSION CHURCH AND SCHOOL, KEIGHLEY, YORKS.—A mission church and school, from plans prepared by Messrs. W. H. & A. Sugden, is to be erected at Thwaites Brow, Keighley.

THEATRE, BALHAM. — The Royal Duchess Theatre, which has been erected on a site in the High-road, Balham, is nearly completed. The cost has been about 35,000*l.* Mr. W. G. R. Sprague is the architect.

NEW SYNAGOGUE, WHITECHAPEL.—The memorial stone of New Hambro Synagogue in Union-street, Commercial-road, Whitechapel, was laid on the 27th ult. The building cost 4,000*l.*, and has been erected by Messrs. Coulsell from plans prepared by Mr. Lewis Solomon. Accommodation is provided for over 400 persons. The memorial

* See "The Patent Office Buildings and their Site," the *Builder*, April 9, 1898.

stone of the old building is preserved at the entrance.

WORKHOUSE CHAPEL, UPTON-ON-SEVERN, WORCESTERSHIRE.—The foundation stone has just been laid of a new workhouse chapel, Upton-on-Severn. Plans were prepared by Mr. Lewis Sheppard, of Worcester, and the contract was obtained by Mr. R. White, builder of Upton-on-Severn. The new building is situate close to the workhouse. It is 42 ft. long by 17 ft. 6 in. wide, and will provide seating room for 100. The main walls will be of brick, with Bath stone dressings; the floor is of wood, with the exception of the chancel, which will be tiled.

IMPROVEMENTS AT ABERDEEN CITY HOSPITAL.—A new block of buildings is being erected at the City Hospital, Aberdeen. The new block is an extension northwards towards the entrance gates of the administration block. Like the rest of the block, the addition is a two-story building, built of coursed ashlar. The extension is 76 ft. from the north front to the junction on the west with the administration block. It is almost exactly the same width, and the building encloses an open central area. In the centre of the north front rises a campanile tower. The main south entrance of the administration block forms also the entrance to the new addition. One part of the extension—along the east side of the ground floor—is isolated from the rest of the block, and is reserved as an addition to the reception, bathing, and discharge accommodation for patients. Otherwise the additional block is devoted to administration purposes. On the ground floor, along the west side, is a dining-hall for ward maids, and four servants' bedrooms. Along the north front on this floor runs a series of three bedrooms for laundry maids, joining at the north-east corner the isolated portion of the block. The accommodation on the upper floor is entirely devoted to bedrooms, &c., for nurses and others of the staff. The erection of the new block has enabled various other changes to be effected at the City Hospital. By knocking three bedrooms into one room a recreation room for the staff has been obtained in the south-east corner of the administration block. Other rooms in the existent building have undergone slight alterations. The cost of the addition will be between 4,000*l.* and 5,000*l.* The architect is Mr. John Rust, and Mr. John Ogilvie has acted as clerk of works. The contractors are:—Mason work, Leslie Smith; carpenter, Leslie & Hay; plasterer, J. Bannochie & Sons; plumber, John Anderson; slater, John Farquhar; painter, Phillip, Huntly-street; bellhanging, Florence & Son; heating, R. Tindal.

COLD STORAGE PREMISES, EDINBURGH.—The buildings and plant at Lochrin, Edinburgh, which have been erected by the Edinburgh Ice and Cold Storage Company, Limited, for the manufacture of ice and for cooling and freezing purposes, are nearing completion. The main building consists of three flats of cold chambers, those on the platform level being intended for carcases of bullocks, sheep, &c., and are fitted with rails with running pulleys. The two upper flats, which are not insulated meanwhile, are intended for the storage of all kinds of perishable commodities, and are kept cool by a constant draught of cold air. The machinery for freezing and cooling is on the Linde ammonia compression system. The premises are lit by electricity throughout. Messrs. Cooper & Taylor were the architects.

BOARD SCHOOL, CHESTERFIELD.—In the paragraph in our issue of August 19 last, stating that a Board School was to be erected in Chesterfield, we omitted to mention that Mr. Hessell Tiltman was associated with Mr. Cecil Jackson as joint architect for the work.

SANITARY AND ENGINEERING NEWS.

DOCK WORKS, &c., SEAHAM HARBOUR.—Extensive dock improvements are being carried out at Seaham Harbour. The new works embrace the construction of two protecting sea piers, the deepening of the entrance channel, and the formation of a deep-water dock on the sites of the south dock and tidal harbour. The foundation and coping stones of the new dock were laid on the 26th ult. The depth of the dock will be 27 ft. 6 in., the width at the entrance 65 ft., and the depth on the sill at high water of ordinary spring tides 25 ft. 6 in. The works have been designed by Mr. H. H. Wake, chief engineer to the River Wear Commissioners, and are being carried out by Messrs. S. Pearson & Son, of London, under the supervision of Mr. P. W. Meik, of Westminster. The contract price is 378,000*l.*

PENZANCE, NEWLYN, AND WEST CORNWALL LIGHT RAILWAY.—The Board of Trade has now confirmed the Order, promoted by the Railway Developments, Limited, of 13, Victoria-street, S.W., for the construction of a light railway, which, joining the Great Western Railway at Marazion, near Penzance, will extend railway communication to the Land's End.

SEWERAGE, ALTRINCHAM.—Mr. Herbert H. Law, Local Government inspector, held an inquiry at Altrincham recently into an application of the Urban District Council for sanction to borrow 22,000*l.* for the construction of a new outfall sewer and the purchase of land adjoining the Council's present sewage farm at Woodcote, near Altrincham. It was explained that Messrs. Hinnell & Murphy, of Manchester, had prepared plans for dealing with the sewage of Altrincham and district, and that the Council had agreed to purchase seventy-fives acres of land from Lord Stamford's trustees for 6,500*l.*, the sum of 15,500*l.* to be devoted to the outfall sewer and the preparation of the land for sewage treatment. Mr. C. E. Newton, C.E., submitted counter plans.

WATER SUPPLY, WIVENHOE.—An inquiry was conducted at the Board Schools, Wivenhoe, on the 24th ult., by Mr. W. A. Ducat, on behalf of the Local Government Board, with reference to an application of the Council for sanction to a loan of 5,450*l.* for purposes of water supply. The scheme, which has been prepared by Messrs. Sands & Walker, civil engineers, Nottingham, was explained to the Inspector by Mr. H. H. Sands, C.E. It is proposed to sink a borehole through London clay into the chalk, the water to be then pumped into iron water tanks erected on top of an ornamental brick water tower to give a good pressure to the higher parts of the district. There was no opposition.

FOREIGN.

FRANCE.—M. Mercié has finished the model for the Gounod monument, to be ultimately erected in the Parc Monceau. Three marble figures representing Sappho, Marguerite, and Juliet, symbolise the three principal works of the composer; these surround a stele supporting a bust of Gounod.——It appears that the finances of the Société des Artistes Français (Old Salon) are not in a state to enable them to carry out M. Loviot's proposed scheme for a building for the Salon of 1900.——A bust of Sainte-Beuve is shortly to be put up at Boulogne-sur-Seine.——The Municipality of Paris has purchased the Hôtel Lauzun, on the Quai d'Anjou.——The exhibition of drawings by Puvis de Chavannes, left by him to the city of Rouen, has just been opened there.——The Municipality of Limoges are proposing to construct, in the Turgot quarter, a large circus capable of seating three thousand spectators.——The French Government has decided on the construction of a port at Gabès, in Tunisia.——The death is announced, at the age of eighty-five, of M. Rivet, architect, who, before the absorption of the suburban communes, was municipal architect of Batignolles, and who since then occupied the position of consulting architect for the Seventeenth Arrondissement until 1885. During a long career M. Rivet had worked hard to bring about the improvement of his district, one of the richest and most populous in Paris, and in which new buildings and new streets were constantly being carried out.

MISCELLANEOUS.

THE PARIS EXHIBITION BUILDINGS.—The first paper of session 1899-1900 of the Royal Institute of British Architects, to be read on November 20, will be on the Buildings of the Paris Exhibition, 1900, by M. Ch. Lucas. The *Journal* of the Institute, in making this announcement, remarks, "There are few Hon. Corr. Members whose relations with the Institute have been so close and cordial as those maintained by M. Lucas, and he is certain to receive a hearty welcome."

THE INSTITUTE OF SANITARY ENGINEERS (INCORPORATED).—At the last meeting of the Election Committee the following new members were elected, viz.:—Fellows—T. R. Nash, London; C. Dunkley, Higham Ferrers. Members—W. H. Baker, Bristol; J. S. Hammond, Romford; T. W. Deadman, St. Margaret's. Associates—H. E. Brown, Peckham; J. W. Hammond, Romford.

SCIENCE AND ART DEPARTMENT.—The following is a list of candidates for 1899 to whom Royal Exhibitions (Art) and Local Scholarships (Art) have been awarded:—*Royal Exhibition.*—J. F. Pettinger, Royal College of Art; G. E. Kruger, Bath; F. E. Hiley, Bristol; B. Clemens, Holloway; T. C. Dugdale, Royal College of Art; Margaret J. Jameson, Edinburgh; A. Somerville, Edinburgh; P. Chisholm, North Shields; Leta R. Roff, Holloway; A. E. Smith, Lydney. *Local Scholarship.*—C. H. Broughton, West Bromwich; Helen M. Pike, Edinburgh; M. Osborne, Bristol; Ethel S. Biddle, Brighton; Ethel M. Hedgeland, Dover; E. E. Atkins, Brighton; J. A. Stevenson, Chester; H. Wooller, Brighton; P. Taylor, Rochdale; T. J. Clapperton, Galashiels; F. M. M. Clark, Aberdeen; J. P. Samuel, Aberdeen; N. Sparks, Bristol; H. Mawdsley, Halifax; T. N. Ault, West Bromwich; H. A. Lake, Nottingham; Ethel M. Hodgkinson, Croydon; Augusta M. Warren, Royal College of Art; A. B. Porter, Royal College of Art; A. Millar, Galashiels.

THE VITULANO MARBLES.—Mr. Neville Rolfe, her Majesty's Consul at Naples, recently forwarded to the British Foreign Office some specimen slabs of marble from the Vitulano quarries now being worked by a Swiss firm, Carlo Izzo & Co. These samples have, by direction of Lord Salisbury, been handed over to the Association of Chambers of Commerce in order that opportunities for inspecting the same may be afforded to persons interested. It was when the Bourbon King Charles III., towards the end of the last century, was building the noble palace of Caserta, about eighteen miles from Naples, that a French geologist discovered the marble quarries of Vitulano. These produced various marbles of beautiful colours, with which his Majesty decorated his magnificent staircase and his gorgeous chapel. Subsequently the quarries were closed, as the King was determined that no one but himself should work them, but in the course of time they were reopened. The marble region is said to extend over some twenty square miles, Vitulano, which is in the province of Benevento, being the centre of the industry. The structure of the marble is what is known as "Saccaroida brecciosa." It is of various colours and beautifully veined, and some of it is rich in shells. The variety of colours includes reddish grey, dark brown, violet, purple, and lilac. In all the varieties silica preponderates over the calcareous matter, so that it is capable of a very high polish, becoming almost transparent and resembling jasper. The marble, Mr. Rolfe reports, can be used for any kind of work. It can be readily put on a lathe, and turns into beautiful pillars for columns, balustrades, and similar uses. Sawn into slabs it becomes suitable for pavements, dados, stairways, and furniture, while under the chisel of the artist it becomes suitable for friezes, bosses, capitals of columns, architraves, and the like. It is also largely used for veneering. The present proprietors have done a great deal by road-making and other works to develop the property and make the quarrying of the marble a simpler operation; they have also applied water power for sawing the blocks and generally have applied modern technical methods to the development of the industry. They are at present handling six qualities of marble, namely:—(1) Pearl grey slightly veined with white or yellow and spotted pink; (2) reddish grey breccia of saccaroid structure; (3) pinkish red of saccaroid structure; (4) light-coloured breccia of saccaroid structure; (5) dark-coloured breccia of saccaroid structure; (6) a red stone. The last three are the finest quality of marble, the first three being of second quality.

EMIGRANTS IN 1898.—According to the statistical tables compiled by the Board of Trade from information officially furnished to that Department, it appears that in the year 1898 the emigrants of British and Irish origin who left our ports included 28 brick and tile makers, potters, &c.; 545 bricklayers, masons, plasterers, slaters, &c.; 214 builders; 65 cabinet-makers and upholsterers; 800 carpenters and joiners; and 440 painters, paperhangers, plumbers, and glaziers—a total, for these specified trades, of 2,092, of whom 900 went to the United States, 203 to British North America, 171 to Australasia, and the remainder to other places.

CLERGY AND ARTISTS' ASSOCIATION.—The fourth Church Congress Exhibition of the Clergy and Artists' Association will be held at the studio at Leighton House, Holland Park-road, Kensington, W. The exhibition will remain open during the Congress week and will include, in addition to the examples of work executed under the auspices of the Association and by its members, representative examples of the work of individual artists and craftsmen working in churches. The Arab Hall and the collection of the late Lord Leighton's sketches and studies will be on view to visitors to the exhibition.

STATUE OF THE QUEEN, DUNDEE.—A statue of the Queen, by the late Mr. Harry Bates, was recently unveiled in Dundee by the Duke of Connaught. The statue is of bronze and occupies a site in front of the north entrance to the Albert Institute, and facing the Royal Exchange.

LEEDS MASTER BUILDERS' ASSOCIATION.—The annual outing of the Leeds Employers' Association has just taken place at Harewood. The members assembled at the New Exchange Club, and lunched together. Char-a-bancs were in waiting, and the party drove by Collingham and the Avenue to Harewood, where the yearly meeting was held. In the absence of the President (Mr. W. Nicholson) the chair was filled by Mr. W. H. Dews (the Vice-President). The report, presented by the Secretary (Mr. W. C. Ellisdon), recorded an increased membership of twenty-eight during the year, and an augmented credit balance. Mention was made of the cordiality of the relations of the employers with the masons who have joined in the formation of a conciliation committee. The Chairman, in moving the adoption of the report and accounts, apologised for the absence of the retiring President, and made sympathetic allusion to the deaths of Mr. E. Wray and Mr. G. Burnell, members of the Association. Touching on the satisfactory arrangement concluded with the masons for the adjustment of local disputes, he observed that it was always a pleasure to the employers to meet the masons in conference. He explained the circumstances which led up to the dispute with the London Order of Bricklayers, and said he saw no immediate prospect of a settlement. He had hoped that with the withdrawal of the Yorkshire lock-out the London Order would have returned to work under the old conditions, which appeared to be satisfactory to the Manchester Society. So far as the masters were concerned, the time of the year was fast approaching when building operations would be unprofitable, and unless a speedy settlement was effected he feared the dispute would continue for a con-

siderable time. Mr. William Irwin seconded, and Mr. E. Umpleby supported the resolution, which was adopted. On the motion of Mr. Irwin, seconded by Mr. J. T. Wright, and supported by Mr. Umpleby and Mr. Hutchinson, Mr. Dews was elected President. Mr. Wright was appointed Vice-President, and Mr. Ellisdon was again chosen as Secretary. The committee were elected as follows:—Messrs. Irwin, Myers, Nicholson, Rhodes, Umpleby, Pickard, Hutchinson, and Oakes. A special vote of thanks was accorded to Mr. Nicholson for his services on behalf of the Association and the building trade generally. The other retiring officers were also thanked. A visit was afterwards paid to Harewood House, and in the early evening the party returned to Leeds, where they dined at the Queen's Hotel, under the chairmanship of Mr. Dews.

THE LATE BARON GRANT.—It is not generally known, for his public spirit seems to have been forgotten, that we owe to the late Mr. Albert Grant the preservation as an open space of the garden in Leicester-square. For some while after the demolition of James Wyld's Great Globe (erected in 1851 from H. R. Abraham's designs) the area remained neglected and desolate, until in 1874 Baron Grant acquired for 13,000*l.* from the Tulk family, inheritors of the Sidney property, their rights over the enclosure. Baron Grant made over the area to the late Metropolitan Board of Works, and we believe defrayed the cost of the Shakespeare fountain, and of the busts of Newton, Hogarth, Reynolds, and John Hunter, formerly residents in Leicester-fields. Baron Grant did not occupy—nor, indeed, was it ever completed—the mansion "Kensington House," which was begun in 1873, after the plans and designs of Mr. James Knowles. For the site, about seven and a half acres, had been demolished the old "Warren" or "Rookery," Colby House, built in 1720 for Sir John Colby, and old Kensington House, the home of Louise de Querouaille, Duchess of Portsmouth, the Cosways, James Elphinston, the schoolmaster and translator of Martial, and in 1819-21 of Mrs. Inchbald. The later Kensington House, upon which it is said nearly 275,000*l.* were expended, having been twice bought in at auction, was ultimately sold in lots in June and September, 1882, realising a total of 9,900*l.* The white marble staircase that reached up to the second floor, and had cost 11,000*l.*, was secured for 1,000*l.* by Madame Tussaud & Sons, and part of it, with the caryatides of heroic size, is now in their exhibition, Marylebone-road; the gilt cast-iron railing, fronting the main road, which cost 3,500*l.*, was purchased for 300 guineas by the Sandown Park Race Committee. The site was speedily covered by the houses known as Kensington-court, built for Mr. J. T. Carr by Messrs. Perry & Reed, Mr. J. J. Stevenson, Mr. T. G. Jackson, and other architects, whilst on the original site of Colby House stands the London and County Bank, erected in 1885, after Mr. Alfred Williams' designs.

ELECTRIC LIGHTING EXTENSION, ST. HELENS, LANCASHIRE. — Colonel W. R. Slacke, R.E., Inspector to the Local Government Board, held an inquiry at St. Helens Town Hall, on the 29th ult., into an application by the Town Council for leave to borrow 3,600*l.* for the purposes of electric lighting. Mr. J. S. Highfield is the Borough Electrical Engineer.

STONEHENGE.—The Salisbury correspondent of the *Standard* states that the feeling throughout South Wilts is strongly in favour of the Government's acquiring Stonehenge at a reasonable price for the nation. On Wednesday, at a meeting of the Wilton Town Council, it was decided to petition the Government in favour of acquiring the ancient monuments, and the Council are calling upon the County Authority and the archæological and antiquarian societies to support the petition. Several members of the Council questioned very much whether Sir Edmund Antrobus has the power of selling the ground around Stonehenge, which has been open to the public from time immemorial. There are several roads and footpaths in close proximity to the monument, and the Council were unanimous in their opinion that the right of the public to the use of those roads should be maintained.

ANTIQUARIAN DISCOVERY AT DORCHESTER.—While some workmen were engaged in making excavations on a building estate on the western side of the town of Dorchester, they came upon an ancient Roman pavement of unusual size, and in an almost perfect state of preservation. There are representations of vases and other figures, and the colouring of the tesseræ is almost as bright as when the pavement was laid down, perhaps 1,500 years ago. Owing to its size, it was at first conjectured that it was the flooring of a temple; but experts who have seen it are agreed that it was a domestic building—probably a villa of a superior class. It is outside the old Roman walls, and not far from the splendid amphitheatre for which Dorchester is noted.—*Bristol Times.*

CAPITAL AND LABOUR.

LEEDS BRICKLAYERS' DISPUTE. — An adjourned meeting of the Leeds Master Builders' Association was held on the 29th ult. at the Builders' Exchange, Mr. W. H. Dews, President, occupying the chair, to consider further replies from members to the circular inviting an expression of their views as to the proposed advance of ½d. per hour in the wages of the London Order of Bricklayers. The complete returns show that seventy-nine members are opposed to the concession of any advance at present, and that eight only are in favour of paying the additional ½d. The vote represents practically exclusively the views of masters who employ bricklayers. The result will be communicated to the Executive of the Yorkshire Federation in due course. The Leeds master builders do not propose to hold any further meeting before the ordinary meeting of their Association in October.

THE PLASTERERS' DISPUTE IN MANCHESTER.—A meeting of employers in the allied building trades was held on the 29th ult., in Manchester, under the presidency of Mr. C. W. Green, of Liverpool, when a distinct advance was made towards a settlement of the dispute in the local plastering trade, which has lasted for twenty-seven weeks. When the national dispute was settled in June the Manchester employés declined to go to work again except at an advance in wages of a penny per hour. The employers offered a halfpenny advance forthwith and another at the end of twelve months, but this the men would not accept, and a deadlock ensued. At the meeting on the 29th ult., however, the men wrote offering to take the second advance at the expiration of six months. On this basis the employers decided to meet the men in conference on Thursday.—*Leeds Mercury.*

LEGAL.

THE BUILDING LINE.

AT Tottenham police-court Thursday last week, the District Council summoned Mr. John C. Hill, a builder, of Upper Holloway, for erecting a house in St. Ann's-road, Tottenham, beyond the front main wall of the next door house, and for continuing the offence for nine days after receiving a written notice from the Council. Mr. R. Cunningham Glen appeared in support of the summons and Mr. Alexander Glen represented the defendant. It appeard that the defendant, who is laying out a new estate, first proceeded to erect seven houses—Nos. 1 to 7—in St. Ann's-road, according to a plan approved by the Local Authority, and that before these were finished he commenced to put up three more, which were brought about 7 ft. further forward than the others. The summons was issued in respect to No. 8 in order to test whether the building line had not been set by the first seven houses. Mr. Alexander Glen, for the defence, contended that as all the buildings were part of the same scheme and were being erected at practically the same time by the same individual the statute did not apply. There was nothing to prevent a man building a new street as he liked, there being no general provision under which a District Council could prescribe a building line, beyond this that they had power to fix the minimum width of a new street. In this instance, if Nos 8, 9, and 10 had been started first there could not have been an offence. He also urged that the summons must fail because No. 7 was an incomplete building.—Mr. R. C. Glen, in reply, said that the law intended that Local Authorities should have control over the building of houses.—The magistrates deliberated in private for some time, and on their return the Chairman (Mr. S. L. Stacey) said they were of opinion that the defendant set his own building line in the construction of the first seven houses, and there would be a penalty of 5*s.* a day, with an allowance of two guineas costs to the District Council.—On the application of Mr. Alex. Glen leave to appeal was granted.

AT Richmond (Surrey) Borough Court recently, Mr. Alfred Baker, builder, Albert-gate, S.W., was summoned at the instance of Mr. J. H. Brierley, Surveyor to the Richmond Corporation, for "erecting a shop or other building at the corner of Selwyn-avenue, beyond the front main wall of the building at the side thereof in the same street, without the written consent of the Town Council, and for having from and after the service of a written notice of such offence upon him on August 4, until the date of the information (August 10) continue the said offence." Mr. Duke, Q.C., appeared for the Corporation, and Mr. Bankes, barrister, for the defendant.

In opening the case, Mr. Duke explained that the proceedings were taken under Sec. 3 of the Public Health (Buildings in Streets) Act, which provided that "it shall not be lawful without the consent of the Urban Authority to erect or bring forward any house or building in any street or any part of such house or building beyond the front main wall of the house or building on either side thereof in the same street, nor to build any addition to any house or building beyond the front main wall and the house or building on either side of the same." Messrs. Baker laid out Selwyn-avenue in 1889, and the building which infringed the Act was at the corner of that street and Kew-road. Mr. Hawkins had six or seven houses beyond, and these were set back 12 ft. from the pathway, and Mr. Baker had erected the outer wall of this house in Selwyn-avenue 11 or 12 ft. beyond the front wall of Mr. Hawkins' premises, which suffered thereby. It was when Mr. Hawkins submitted his plans that the building line was defined, but at the corner of Kew-road nothing had been raised above the ground level. In June defendant sent in plans for the erection of shops, and they were disapproved, and though some alterations in them had been made, they still failed to comply with the law.

Mr. Bankes admitted that the building projected 10 ft. beyond Mr. Hawkins' house.

Mr. Brierley, Surveyor to the Corporation, gave evidence bearing out the statement of counsel. He knew nothing of plans which had been submitted in 1890, but he understood that a Mr. Lane put in footings and afterwards abandoned the building.—By Mr. Bankes: Mr. Baker was building on the wall originally put in, but also on independent footings which extended further along Selwyn-avenue. Witness had heard that the builder Lane had not completed his work on account of some difficulty with regard to the sewer connexion. It could not be said that defendant was carrying out Lane's plans. Mr. Brierley, continuing, said that from 1890 to 1899 nothing was done to the footings, which were not above the level of the ground. There was nothing to protect the property, and there was no need to do so; the ground in question was originally enclosed by the boundary wall of the estate, but this had gradually disappeared.

Henry Hawkins, builder, deposed that there were no buildings on the ground adjoining his property when he built the houses.

Mr. Bankes said that the estate began to be developed in 1889, and among the people who submitted plans was Mr. Lane, who commenced to build. The present building was on exactly the same footings.

Mr. Alfred Baker deposed that he purchased the estate in 1888. He deposited plans on behalf of Lane, and they were approved, the Kew-road frontage being set back 4 ft. For this he received no compensation. When Mr. Lane was building there was no opposition on the part of the Local Authority, but on account of the difficulty with the sewerage connexion Lane stopped the building and witness took over the work already done. Nothing had been done to it until quite recently. Plans were sent in this year, and the flank wall was exactly the same as in Mr. Lane's building, whilst no portion of the building was in front of the line.—By Mr. Duke: Witness let the land to Mr. Lane as a builder, and eventually advised him that it was inadvisable to proceed. He contended that the written consent obtained in 1890 must be binding.

Mr. Duke said there appeared to be a kind of professional succession set up as to plans. Mr. Lane proposed to erect buildings which he did not carry out, and he was relieved from the responsibility by the defendant. Consent was given to build before Hawkins' houses were put up, but defendant had not received any such consent, his plans being disapproved. There was no hardship; it was a case in which two adjoining owners had their rights, and defendant ought to put back this flank wall to the extent of 3 ft. 6 in. He asked for a reasonable penalty.

The Bench decided to fine defendant 5*l.*, viz., 1*l.* a day for five days (August 6 to 10), and 5*l.* costs.

It was intimated that notice of appeal would probably be given.

MONEY TO COMPLETE BUILDINGS:

CASE IN THE VACATION COURT.

THE case of Foster *v.* Asman came before Mr. Justice Cozens-Hardy, sitting as Vacation Judge, on the 30th ult., on a motion by the plaintiff for the appointment of a receiver and for leave to raise a sum of money in order to complete certain buildings, the plaintiff being mortgagee of the property for 27,000*l.*

After some discussion, it was arranged that the plaintiff should have liberty to raise 3,000*l.* for the purpose of completing the buildings, and that a Mr. Blackburn should be appointed receiver of the property.

MEETINGS.

WEDNESDAY, SEPTEMBER 6.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

SATURDAY, SEPTEMBER 9.

British Institute of Certified Carpenters.—Visit to the works of the London County Council, Belvedere-road. 3.30 p.m.

RECENT PATENTS:

ACCEPTED SPECIFICATIONS.

Open to Opposition until October 23.

[1898.] 11,281, Weiss, Turning Lathes for Producing Round, Oval, Polygonal, and other Shapes upon Wood, Metal, and other Substances. 17,379, Lewton, Joist and Rafter Shoes. 17,478, Weygang, Siccative Oils and Var-

nishes. 17,601, Oliver, and 20,823, Thomas-Davies, Electrical Arc Lamps. 17,660, Rotru, Bolt or Latch for Doors and Windows. 17,663, Kesson, Brick Making Machinery. 18,165, Bussons, Electrical Signalling or Indicating Apparatus. 19,550, McLellan, Pulverisers and Disintegrators. 20,379, Wyke, Liquid Pressure Engines for Blowing Organs, &c. 20,383, Levitt, Hoist for Cellar or other Work. 20,511, Simpson & Jones, Planing, Milling, and Shaping Machines. 20,626, Crees; [1899] 13,786, Sunderlands and Marshall; and 14,124, Van Hamont, Generation of Acetylene Gas. 20,750, Reeves, Control of Distant Gas Burners. 21,175, Eustace, Means for Glazing Without Putty. 21,183, Foggo, Ratchet Lever for Hauling, Lifting, &c. 21,228, Paydon, Water Supply for Houses, Workshops, &c. 21,383, Brooks, Flexible Curves for Draughtsmen's Use, &c. 21,418, Wilkinson, Casting and Stamping Aluminium and other Metal Articles. 21,438, Copleys, Tool Holder for Screw Cutting Lathes. 21,543, Manton, Bolts for Locking Windows, Doors, &c. 21,638, Stuart & Barton, Arc Lamps for Projection and for Laboratory or Similar Purposes. 21,700, Herbert, Compound Hinges, Particularly Applicable for Casements and Doors. 21,716, Kelvin, Electrical Measuring Instruments. 22,078, Dupuy & Ray, Street-sweeping Machines. 23,134, Gothot, Apparatus for Drying, Roasting, or Steaming by Means of Hot Gases. 25,314, Soc. Anon. pour la Transmission de la Force par l'Electricité, Apparatus for Transforming Alternating into Continuous Electrical Currents, and Conversely. 26,494, Watson, and [1899] 9,672, Spagnoletti & Crookes, Electrical Switches. 26,935, Universal Calculator Company, Calculating Machines. [1899] 290, Georis, Carburettors. 762, Thompson, Safety Suspending Apparatus for Sliding Windows, Shutters, &c. 1,581, Pein, Enamelled Pipes and Tubes. 2,579, Walbridge, Down-draught Stoves and Furnaces. 8,045, Greenfield, Armoured Electrical Cables. 8,498, Rennerfelt, Electrical Elevators. 8,752, Shearer & Wedderburn, Gas Economising Device for Incandescent Gas Lights. 9,991, Howell, Water-closets. 11,669, Tietjen, and 13,956, Kleemann, Window-cleaning Appliances. 11,889, Siedentopf, Pipe Joints. 12,175, MacCoy, Time Recorders for Workmen and other Servants. 12,664, Timm, Rotary Furnaces or Kilns for Burning Cement, Lime, &c. 12,679, Börner, Treatment of Stable Refuse, &c. 12,693, Bergmann, Registering Mechanism for Electricity Meters. 12,859, Killmer, Spades. 12,931, Wissenbach, Anti-friction Collar Plate for Vices. 13,026, "Long Arm" System Company, Apparatus for Opening and Closing Bulk-head Doors, Ports, Valves, Gates, and other Reciprocating Devices. 13,807, Bachmeyer, Supports for Incandescent Mantles. 13,925, Kester & Hecht, Self-fluxing Solder. 14,034, Kettmann, Gas-Soldering Apparatus. 14,455, Debons, Apparatus for Preventing the Backward Movement of Waggons, &c., Upon Inclines. 14,473-4, Reck, Hot-water Heating Apparatus. 14,593, Mackie, Hand-vice and other Strainers or Stretchers for Telegraph and other Wires. 14,669, Allen, Metal Door-knobs. 14,813, Reno, Inclined Passenger Elevators and Lifts. 14,877, Wulff & Blunck, Sound-proof Telephone Cabinet. 14,900, Wood, Gas-burners.

ABSTRACTS OF PATENTED INVENTIONS.

9,737.—MOULDS FOR PLASTER AND OTHER CASTS: *C. H. Rott.*—For the casting of elastic moulds from clay models in relief, varnish or collodion is applied to the surface of the model, the film thus produced is slightly oiled, and then a mould of glue, gelatine, or mixtures thereof with glycerine or treacle can be taken from the model.

9,745.—AUTOMATIC CUT-OFFS FOR GAS VALVES AND COCKS: *A. H. Penman.*—At various points of the gas supply are placed valves which are normally held open by supports of fusible metal, in one form a button of fusible metal secured to the valve spindle rests upon a plate carried by ledges formed in the casing or separately, to be turned by hand for closing of the valve, access to the casings interior is afforded by means of apertures closed by caps.

9,748.—LADDERS: *U. Holborow, A. Holborow, and A. Paice.*—The steps are fixed to links that are pivotted to parallel bars in such a way that they will fold up when the ladder is shut, the back-struts being pivotted to the upper ends of the front bars and joined by pivotted rods or links to the rear bars; other links or bars, bearing against a horizontal bar attached to the back supports, serve to limit the opening of the ladder.

9,785.—DISCONNECTING PIPE COUPLINGS: *T. F. Hammer.*—The pipes are screwed into two parts, between which is placed a ring of soft metal or other material, whose surfaces are zones of different spheres which fit against correspondingly-shaped surfaces of the ends of the parts, clearance is made at suitable places between the parts which are coupled together by a nut; the surfaces of the ring and of the ends of the parts may also be conical, instead of being spherical.

9,812.—CRANES AND HOISTS FOR PILING TIMBER: *G. B. J. & I. Groves.*—The crane-post is fastened on to the projecting ends of the planks by clamps. The lifting-rope passes around guide-pulleys, and a support for the planks is provided by means of a platform which is pivotted to an adjustable clamp. Another rope, travelling over a pulley, lifts the crane-post as the pile rises.

9,820.—WINDOW SASHES: *A. Hawley.*—The stiles of each sash are vertically divided into two parts, pivotted together so as to let the sashes turn and slide inside a frame, after the kind specified in No. 13,068 of 1895, and they have rabbetted joints, the lower half of the bottom sash being less wide than its upper half, by which arrangement the outer sliding stiles of the upper sash are enabled to pass when the sashes swing upon their pivots. The sashes can be raised and lowered and turned, as may be desired, after the withdrawal of the sliding bolts which fasten them together, and they are secured by means of a screw working loosely through a hole in a plate upon the bottom sash's meeting-rail, and entering a screw-threaded tube which is pivotted on to a swivel-bracket fixed to the upper sash's meeting-rail.

9,834.—LATCHES AND LOCKS: *G. H. & A. M. Innes.*—The latch bolt, shaped in the form of a bevelled disc, rolls down an incline in the case of the lock and normally projects therefrom, the disc being rolled back by the finger. A removable pin holds back the latch, or it may be locked by a pivotted sector, to be turned by a key.

9,895.—A SUPPORT FOR ELECTRICAL LAMPS: *W. J. Davy & G. Thomas-Davies.*—The arc lamp is raised or lowered by a cord secured to a drum, which is turned upon its bearing by a handle, whereof the shaft carries a stud that is engaged in the slotted projection upon the drum. When the shaft is pushed in after the stud has entered the slot, its rounded end displaces the bevelled arms of weighted pawls, that engage in ratchet teeth upon the drum, so that the lowering of the lamp is then regulated by means of the handle.

9,934.—COMPOSITIONS FOR DECORATIVE PURPOSES: *T. Holden & C. Brooke.*—A composition to be used for the relief decoration or lettering of walls, ceilings, and other surfaces is made of 28 lbs. of whiting soaked in water, to which are added ½ lb. of dissolved glue and three pints of boiled linseed oil, together with from one-third to one-half of the whole amount of plaster of Paris, also mixed with water; for a waterproof compound adapted for use upon glass, wood, or other non-porous surface, an admixture is made by measure, of whiting, four parts; zinc white or white lead, two parts; shellac dissolved in methylated spirit, two parts; and japanner's gold size, one part; and colouring matter can be added.

9,965.—AUTOMATICAL SPRINKLERS: *C. Linser.*—The valve or spreader, which is cone-shaped, and has a number of slits cut radially in its turned up periphery, is pressed on to its seating by means of a lever that is fixed to the nozzle-frame by a band made of some fusible composition, whilst after the lever is fastened, the valve is pressed down by a screw; in another form a fusible strip, passed around the end of the lever, takes the place of the fusible band.

10,005.—MANHOLES, AND INSPECTION AND CLEANSING OPENINGS: *M. J. Adams.*—Lateral channels, projecting sideways, are fitted on to the open channels which lead to the outlet trap, and are fashioned to the same curve in order that they be available for use on either the right or the left, the inspection-eye being placed as nearly in the line of the drain as is possible.

10,008.—INCANDESCENT LAMPS: *J. Loeser & A. Lecomte.*—A cap upon the outer chimney heats the entering air and supports the inner chimney, the air being also heated in its descent between the chimneys and as it passes through the double burner-body in which the perforations are set upon the "hit-and-miss" principle; a ring carried by vertical arms on the holder of the outer chimney may, in some cases, be used instead of the cap.

10,109.—WORKMEN'S TIME-CHECKING APPARATUS: *A. Griffiths.*—The inventor's object is to provide means of changing periodically the time-printing type; in the train of a primary clock is fitted a toothed wheel which rocks a bell-crank lever at, say, each minute of time, and releases the fly of the train of a secondary clock which thereupon runs until a cam is stopped by a pawl on a lever that rises and falls with the bell-crank lever, the secondary clock also drives a pin-wheel which rocks another lever, thereby drawing up a rod and effecting a change of the type.

10,031.—HINGES: *A. L. Stansbury & J. White.*—To the hinge-flap on the door, &c., is pivotted a weighted bell-crank; the hinge-flap on the frame has its flange slotted; the opening of the door causes the flange and the crank to engage one with the other, so that the door cannot be accidentally closed. When the finger-piece is pressed upwards the door is set free.

10,046.—FLOORS: *G. Lilienthal.*—Over the floor beams are spread, with a certain amount of slack, layers of paper or of fabric and wire gauze or netting. Concrete is filled in the meshes of the netting, so as to soften the paper and make it bulge into the meshes. The levelled concrete floor is then covered with linoleum or other material.

10,113.—BUTT AND FLANGE JOINTS: *W. J. Quick.*—Annular grooves, which inter-lock, are formed respectively in the flanges, which are jointed together, either with or without packing, by means of bolts (secured by nuts) which pass through the flanges.

PRICES CURRENT OF MATERIALS:

WOOD.*

Per Petersburg standard hundred.

	£	s.	d.	£	s.	d.
White Sea: first yellow deals	17	0	0	18	0	0
Second do.	13	5	0	14	15	0
Third do.	11	10	0	12	15	0
Battens, 40s., 30s., and 15s. less respectively.						
Petersburg: first yellow deals	13	15	0	16	5	0
Second do.	10	15	0	12	5	0
Battens, 30s. and 20s. less respectively.						
Petersburg, white deals	9	15	0	11	15	0
Do. white battens	8	5	0	9	15	0
Riga, white deals	8	5	0	9	5	0
Swedish mixed yellow deals	13	5	0	16	15	0
Third do.	12	5	0	14	15	0
Fourth do.	10	15	0	11	15	0
Fifth do.	9	15	0	10	15	0
Battens, 30s., 20s., and 10s. less respectively.						
Whitewood, 10 to 20 per cent. less.						
Finnish unsorted yellow deals	9	15	0	10	5	0
Battens, 10s. and 5s. less respectively.						
Whitewood, 5 to 10 per cent. less.						
Norwegian second yellow battens	8	5	0	9	5	0
Third do.	7	15	0	8	15	0
Fourth do.	7	5	0	8	5	0
Whitewood, 10s. less.						
Danzig, Crown Deck deals, per 40 ft. 3 in.	0	15	0	1	5	0
Brack	0	12	0	1	0	0
St. Lawrence Pine deals, &c., per P.S.H.:—						
1st, Bright and Dry, regular sizes	20	10	0	27	0	0
" " oddments	13	10	0	20	5	0
2nd " regular sizes	15	10	0	18	15	0
" " oddments	11	0	0	14	10	0
3rd " regular sizes	9	10	0	11	0	0
" " oddments	8	0	0	9	0	0
4th " regular sizes	7	15	0	8	10	0
" " oddments	7	0	0	7	15	0
St. Lawrence Spruce deals, &c.						
First, regular sizes	8	15	0	10	15	0
Second "	7	10	0	8	10	0
Third "	7	5	0	8	0	0
Fourth "	6	5	0	7	0	0
Oddments and battens at 20s., 10s., 7s. 6d., and 5s. less respectively.						
New Brunswick Spruce deals, &c.	7	5	0	8	0	0

* The prices named are for the wood as imported and landed in the docks. Ten per cent., approximately, should be added in order to arrive at the current trade prices.

PRICES CURRENT—*continued.*

	£	s.	d.	£	s.	d.
Oddments, battens, and fourths	6	10	0	7	10	0
United States pitch pine planks and boards	8	5	0	11	15	0
Prepared Boards, per square						
1½ by 6½ and 7 in. 1st yellow		11	6		14	9
" " 2nd "		10	0		11	9
1 by 6½ and 7 in. 1st "		8	6		10	9
" " " white		8	0		8	9
" " 2nd yellow		8	0		9	9
" " " white		6	6		7	3
¾ by 6½ & 7 in. 1st & 2nd yellow		7	3		8	0
" " " white		6	9		7	6
¾ by 6½ and 7 in. 1st yellow and white (grooved, tongued, and beaded)		6	3		8	9
¾ by 6½ and 7 in. 2nd yellow and white (ditto)		5	3		7	6
⅝ by 6½ and 7 in. 1st yellow and white (ditto)		5	3		6	0
⅝ by 6½ and 7 in. 2nd yellow and white (ditto)		4	9		5	6
Narrower widths at 10 per cent. less.						
3rd quality at 15 per cent. less than 2nd.						
Danzig and Memel Fir Timber— per load						
Best middling	2	10	0	3	10	0
Good middling and Second	2	0	0	3	5	0
Common middling	1	10	0	2	10	0
Undersized	1	10	0	1	15	0
Swedish and Norwegian Balks	1	5	0	1	15	0
Baltic Oak Timber—						
Danzig and Stettin—Large	3	5	0	3	15	0
Small	2	0	0	2	5	0
Quebec Timber per load						
Yellow Pine	3	15	0	5	10	0
Oak	4	5	0	6	5	0
Elm	4	17	6	5	15	0
Ash	4	2	6	5	5	0
Birch	3	7	6	5	5	0
New Brunswick, &c., Birch	2	2	6	2	17	6
American Pitch Pine Timber	3	6	0	4	0	0
Wainscot, per log, 18 cubic ft.—						
Crown (Eng. & Dutch) nominal	5	5	0	7	0	0
Brack nominal	4	10	0	5	10	0
Lathwood, per cubic fathom—						
Petersburg	4	0	0	6	10	0
Riga and Danzig	4	10	0	5	10	0
Norway Poles, per ft. run	0	0	1	0	0	1½
Oak Staves, per mille full size pipe						
Memel, Crown	210	0	0	220	0	0
Brack	180	0	0	190	0	0
Danzig	165	0	0	175	0	0
Bosnia, single Barrel (nominal)	28	0	0	30	0	0
United States, Pipe	35	0	0	42	10	0
Hogshead, extra heavy and double extra	27	10	0	32	10	0
Indian Teake per load	11	15	0	16	15	0
British Guiana Greenheart	0	0	0	8	0	0
Mahogany, per foot superficial—						
Honduras, cargo average	0	0	4½	0	0	6
Nicaragua, do.	0	0	4½	0	0	5½
Tabasco, do.	0	0	4	0	0	6½
Mexican, do.	0	0	3½	0	0	4
Panama, do.	0	0	3	0	0	4
African, do.	0	0	3½	0	0	5
Cuba, do.	0	0	5½	0	0	7½
St. Domingo, do.	0	0	5	0	0	7
Do. Curls (good to prime)	0	0	9	0	1	3
Walnut, American (logs)	0	2	3	0	4	6
Do. do. (planks and boards)	0	2	0	0	7	6
Italian, per foot superficial	0	0	3	0	0	7½
Black Sea, per ton	6	0	0	12	0	0
Satin Walnut (logs) per foot cube	0	1	0	0	1	3
" (planks and boards)	0	2	0	0	2	9
Sequoia (Californian redwood), per foot cube	0	1	9	0	2	0
Whitewood, American (logs)	0	1	3	0	1	6
" " (planks and boards)	0	1	6	0	2	9
Quartered oak " " "	0	2	3	0	4	0
Kauri pine (logs)	0	1	9	0	2	0
" " (planks)	0	2	3	0	2	9
Jarrah (planks)	0	2	3	0	2	6
Lancewood spars each, fresh and large	0	5	0	0	8	0
Lancewood spars, ordinary to fair	0	4	0	0	5	0
Degame spars	0	8	0	0	10	6

METALS.

IRON—Pig, in Scotland ton	3	7	5	0	0	0
Bar, Welsh, in London	6	0	0	6	5	0
Do. do. at works in Wales	5	15	0	5	17	6
Do. Staffordshire, in London	6	5	0	7	10	0
COPPER—British cake and ingot	80	10	0	81	0	0
Best selected	81	0	0	81	10	0
Sheets, strong	85	0	0	86	0	0
Chili bars	76	17	6	0	0	0
YELLOW METAL lb.		6¾d.			7¼d.	
LEAD—Pig						
Spanish ton	15	0	0	0	0	0
English Com. Brands	15	5	0	0	0	0
Sheet, English, 6 lbs. per sq. ft. and upwards	16	5	0	0	0	0
Pipe	16	15	0	0	0	0
ZINC—English sheet ton	28	0	0	0	0	0
Vieille Montagne	29	0	0	0	0	0
Spelter	22	10	0	22	12	6
TIN—Straits	142	5	0	0	0	0
Australian	142	7	6	142	12	6
English Ingots	145	0	0	146	0	0
Banca	0	0	0	0	0	0
Billiton	0	0	0	0	0	0

OILS.

Linseed ton	21	10	0	0	0	0
Cocoanut, Cochin	29	5	0	0	0	0
Do. Ceylon	25	15	0	0	0	0
Palm, Lagos	24	0	0	0	0	0
Rapeseed, English, pale	24	15	0	0	0	0
Do. Brown	23	5	0	0	0	0
Cottonseed ref.	17	15	0	18	15	0
Oleine	17	5	0	19	5	0
Lubricating U.S.	0	5	9	0	7	9
Do. Black	0	5	0	0	6	0
TAR—Stockholm barrel	1	6	6	0	0	0
Archangel	1	0	0	0	0	0
Turpentine	33	7	6	0	0	0

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
Plans for Schools	Northfleet Sch. Bd.	15l. 15s.	Sept. 4
Town Hall	Borough of Workington	40l.; 20l.; and 10l.	Sept. 15
Public Library	Dumfries and Maxwelltown T.C.	Not stated	do.
Bank, Norwich (Local Competition).	Directors of Norfolk & Norwich Savings Bank	50 gns.; 20 gns.; & 10 gns.	Sept. 16
Designs in Tunbridge Ware	Tunbridge Wells Tech Education Com.	3 gns.; 2 gns.; 1 guinea	Sept. 30
New Public Market	Bd. of Public Wks. for Island of New Providence, Bahamas, West Indies	40l. 10l. 5l.	Nov. 30.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Reservoir (17,000,000 gallons)	Carmarthen Corp.	Boro Surv. Town Hall	Sept. 2
Sanitary Conveniences	Windsor T.C.	Boro Surv. Helena-road, Windsor	do.
Road Works, Canal-st. and Fryer-st.	Wolverhampton Corp.	J. W. Bradley, Boro. Engr Town Hall	do.
Two Houses, Park-rd, Loughborough	J. Bennett	A. E. King, Archt. Baxtergate, Loughborough	do.
House at Gasworks, Meadow-lane	Leeds Corp.	R. H. Townsley, Municipal Buildings, Leeds	do.
School, Warren, Chapeltown, near Sheffield	Ecclesfield Sch. Bd.	G. A. Wilson, Archt. Hartshead-chmbrs, Sheffield	do.
Additions to Farmhouse, Burnside, Rannagulzion, N.B.		L. & J. Falconer, Archt. Blairgowrie	do.
Stores shed, &c.	Levenshulme (Lancs.) U.D.C.	J. Jepson, Surv. 8A, Tiviot-dale, Stockport	do.
Electric Power Station	Dundee T.C.	W. Alexander, City Archt. Dundee	do.
Waterworks, Killeens	Cork D.C.	J. Cotter, Council Offices, Cork	do.
Alterations, &c. to Offices, Astley Bridge	Bolton Corp.	R. G. Hinnell, Town Hall	do.
Widening Dock Entrance, Spencer Dock	Belfast Harbour Commissioners	G. F. L. Giles, Harbour Engr. Belfast	Sept. 4
New Asylum	East Sussex Visiting Committee	G. T. Hine, 35, Parliament-street, S.W.	do.
Sewering of the Village of Sonning	Wokingham R.D.	R. W. Hamilton, 56, Hamilton-rd. Reading	do.
Sewerage Works, Cobb	Lyme Regis T.C.	Town Clerk, Lyme Regis	do.
Technical Institute	Padiham U.D.C.	H. Ross, Archt. Cannon-street, Accrington	do.
Granite and Slag	Wellingborough U.D.C.	J. T. Parker, 29, Church-st. Wellingborough	do.
Setts	Belfast Harbour Comrs.	G. F. L. Giles, Engr. Harbour Offices	do.
Tenements, Main-st. Camelon	Falkirk Heritable Property Co.	J. P. Goodsir, Archt. Newmarket-st. Falkirk	do.
Granite and Slag	Wellingborough U.D.C.	J. T. Parker, 29, Church-st. Wellingborough	do.
Additions to Premises, Meadowfield, Brandon, Durham	Co-op. Soc.	W. Perkins, Archt. Bishop Auckland	do.
Playground Pavilion, Whitehaven		A. Huddart, Archt. 22, Lowther-st. Whitehaven	do.
Two Warehouses, Calder Oilcloth Works, Sowerby Bridge		Jackson & Fox, Archt. 7, Rawson-st. Halifax	do.
Three Iron Staircases, also Cast Iron Water Mains, &c.	Halifax Union	W. C. Williams, Archt. 29, Southgate, Halifax	do.
Houses, Sheriffmuir, Orton, N.B.		H. Hamilton, St. Mary's Cottage, Orton	do.
Painting Council Offices, Sewage Works, &c.	Thornhill (Yorks.) U.D.C.	S. W. Parker, Surv. Council Offices, Thornhill	do.
Four Houses, Shaw Cross, Batley		J. H. Brearley, Archt. Hanover-st. Batley	do.
Warehouse and Factory, Elizabeth-st. Belfast	Wheeler & Co. Ltd.	J. J. Phillips & Son, Archt. 61, Royal-avenue, Belfast	do.
Street Works, Sydney-st.	Boston (Lincs.) U.D.C.	W. H. Wheeler C.E. Council Offices	do.
Concrete Footways (10,000 yds. supp'd)	Drogheda Corp.	Borough Surveyor, Town Offices	Sept. 5
Widening, &c. Old-st.	Clevedon U.D.C.	G. W. Knowles, C.E. St. John's-rd. Clevedon	do.
Road Works, Hawthorn-st. &c.	Consett (Durham) U.D.C.	W. S. Shell, Surv. Parliament-st. Consett	do.
Cherbourg Quartzite (1,500 tons)	Aldershot U.D.C.	N. F. Dennis, C.E. Council Offices	do.
Repairs to Entrance of Graving Dock at the Camber, Portsmouth	Boro. of Portsmouth	Boro. Engr.'s Offices, Town Hall, Portsmouth	do.
Block of Schools at Chase Side, Enfield	Enfield Sch. Bd.	G. M. T. Laurence, 181, Queen Victoria-st, E.C.	do.
Entrance, Judges' Lodgings, Hyde-terrace, Leeds		City Engr. Municipal-bldgs. Leeds	do.
Retaining Wall, Tehidy-terrace	Falmouth U.S.A.	Boro Surv. Municipal-bldgs.	do.
New Wesleyan Church		Gordon, Lowther, & Gunton, Finsbury House, Blomfield-street, E.C.	Sept. 6
Sewerage Works, &c. Egmont-road	Sutton (Surrey) U.D.C.	C. C. Smith, Surv. Council Offices	do.
Steel rails, &c. for Tramways	Waterloo (Lancs.) U.D.C.	F. S. Yates, C.E. Town Hall, Waterloo	do.
Platform Coverings, Ealing Station	G. W. Ry. Co.	G. K. Mills, Sec. Paddington Station, W.	do.
Eleven Houses, Cwmaman, Aberdare		J. L. Smith, Archt. Aberdare	do.
Alterations to Brickhouse Farmhouse, Colchester		H. Goodyear, C.E. Town Hall, Colchester	do.
Remodelling Property, Fylands Bridge, Bishop Auckland	J. W. P. Page	F. H. Livesay, Archt. Newgate-street, Bishop Auckland	do.
Building Works at Chapel, Gwaun-cae-Gurwen, Glam.		Rev. M. Davies, Gwaun-cae-Gurwen	do.
House and Surgery, Cwmdare, Aberdare		T. Roderick, Archt. Aberdare	do.
Drill Hall, Huddersfield		W. Cooper, Archt. 4, Kirkgate-bldgs. Huddersfield	do.
Wesleyan Church and Schools, Sandgate, Kent		Gordon & Co. Archt. Finsbury House, Blomfield-street, E.C.	do.
Passenger Station, &c. Westbury, Wilts.	G. W. Ry. Co.	G. K. Mills, Paddington Station, W.	do.
Gas and Water Mains	Clacton-on-sea U.D.C.	S. Francis, Gas & Water Offices, Clacton	do.
House at Cemetery, Stottercliffe	Penistone (Yorks.) Burial Bd.	G. A. Wilde, Archt. Bank-st. Sheffield	do.
School, and Alterations of Chapel, Sowerby Bridge		Sutcliffe & Sutcliffe, Archt. Albert-st. Hebden Bridge	do.
Church Building Works, Westbury-on-Severn, Glos.		Rev. L. Wilkinson, The Vicarage, Westbury, nr. Newnham	do.
Road Maintenance	Larne (Ireland) R.D.C.	W. Hay, Union Offices, Larne	do.
Granite Macadam	Ashton-in-Makerfield U.D.C.	J. W. Liversedge, Surv. Council Offices	do.
Whinstone	Pontefract Corp.	A. Oddy, Boro. Surv. Town Hall	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Sewer, Wadsley-rd. &c.	Wortley R.D.C.	G. E. Beaumont, Surv. Workhouse, Grenoside, nr. Sheffield	Sept. 7
Tar Macadam Paving, &c.	Rothesay (N.B.) T.C.	J. Morrison, Burgh Surv.	do.
*Five Blocks of Buildings	County Borough of Devonport	The Borough Surv. 30, Ker-st. Devonport	do.
Coastguard Station, Ballycrovane, Co. Cork		H. Williams, Office of Public Works, Dublin	do.
Boundary Wall, &c. Roundhay Park	Leeds Corp.	City Engr. Municipal Buildings	do.
Public School, Comely Bank	Edinburgh Sch. Bd.	R. Wilson, Archt. 3, Queen-st. Edinburgh	do.
Levelling, &c. Manchester-rd. & others	Reading S.A.	J. Bowen, Boro. Engr. Town Hall	do.
Twenty-four Houses and Three Shops	Devonport T.C.	J. F. Burns, Boro Surv. 50, Ker-st. Devonport	do.
Building Works, &c. at Dispensary, Liberty-street	Cork Union	J. Cotter, Workhouse, Cork	do.
Building Works at Dispensary, Carrignavar	do.	do.	do.
Public Halls, Springburn	Glasgow Corp.	J. Lindsay, City Chambers, Glasgow	do.
Additions, &c. to old Fire Brigade Station	Ipswich Corp.	Engineer, Waterworks Offices, Ipswich	do.
Thirty-three Houses, Folkestone-st. Bradford Moor	Bradford Prov. Indus. Soc.	Rycroft & Firth, Archt. Manchester-rd. Bradford	do.
Wall, &c. at Cemetery, Lapland	Cork Union	J. Cotter, Union Offices, Cork	do.
Villa and Stabling, Baildon, Yorks.		J. Robertshaw & Son, Archt. 55, Tyrrel-st. Bradford	do.
Water Main, Knockbracken	Belfast Water Comrs.	L. L. Macassey, C.E. Water Office, Belfast	do.
C.I. Pipe Laying, &c. Old Park	do.	do.	do.
Rebuilding Business Premises, Castle st Barnstaple		A. Thorne, Barnstaple	do.
Post Office, Darwen, Lancs.		J. B. Thornley, Archt. Darwen	Sept. 8
Coastguard Buildings, Cromarty, N.B.	Admiralty	Director of Works, 21, Northumberland-av W.C.	do.
Twenty Cottages, Hands-lane, Commonside	Sheffield Corp.	C. F. Wike, C.E. Town Hall	do.
Sewering, Kerbing, &c. Cabbell-rd.	Cromer U.D.C.	A. F. Scott, Surv. Church-st. Cromer	do.
Kerbing, &c. Bridge-st. Dollar, N.B.		J. S. Henderson, Town Offices, Dollar	Sept. 9
Intermediate School, Rhyl		J. R. Jones, 4, Brighton-road, Rhyl	do.
Electric Light and Traction Plant	West Ham U.D.C.	W. C. Ullmann, Elec. Engr. White Post-lane East Ham	do.
Tramway Rails	East Ham U.D.C.	do.	do.
Electric Lighting and Traction Plant	do.	do.	do.
Store and Two Houses, School-lane, Brinscall, Lancs.		J. B. Thornley, Archt. Market-st. Darwen	do.
Reconstruction, Invergyle House, Loch Katrine	Glasgow Corp.	J. M. Gale, Engr. 45, John-st. Glasgow	do.
Reservoir, Cowgill Burn, Airdrie, N.B.		M'Dreaths & Stevenson, C.E. 208, St. Vincent-street, Glasgow	do.
Nineteen Houses, Netherfield-lane, Parkgate, Rotherham	F. Mason	J. Platts, Archt. High-st. Rotherham	do.
River Bridge, Walton-le-Dale	Lancs. C.C.	W. H. Radford, Engr. County Offices, Preston	Sept. 11
Water Works, Fairlie	Ayrshire C.C.	P. C. Hart, C.E. 32, John Finnie-st. Kilmarnock	do.
Infirmary, &c. at Workhouse	Bakewell Union	E. M. Longdon, Archt. Town Hall	do.
Free Church Manse, Botriphine, N.B.		B. B. Pratt, Archt. County Bank House, Elgin	do.
Additions to Fermoy House, Cork		W. H. Hill & Son, 28, South Mall, Cork	do.
Sewering, &c. Wellington-st.	Arnold (Notts) U.D.C.	J. R. Swift, Front-street, Arnold	do.
New Road, Lansdowne	Bournemouth T.C.	F. W. Lacey, Boro Engr. Town Hall	do.
Main Sewer	Hindley (Lancs.) U.D.C.	A. Holden, C.E. Council Offices	do.
Asylum Superstructure	Croydon Corp.	Boro Engr. Town Hall	Sept. 12
Office and Lavatory Accommodation	Poplar and Stepney Sick Asylum	J. & S. F. Clarkson, 136, High-st. Poplar	do.
Supply of Barges and Removal of Slop, &c.	St. Mary, Islington, Vestry	At Vestry Depot, Liverpool-rd. N.	do.
Dynamos	Hackney Vestry	E. Hammond, C.E. 64, Victoria-st S.W.	do.
Renovation Works, Canal-rd. Bradford		Mines & France, Archt. Bradford	do.
Shop, Warehouses, &c. Endmoor	Kendal Co-op. Soc.	J. Stalker, Archt. 57, Highgate, Kendal	do.
Surveyor's Materials	Croydon R.D.C.	J. Wilson, Town Hall	Sept. 13
Alteration to Town Hall	Bermondsey Vestry	The Surv. Town Hall Bermondsey	do.
Buildings at Sewage Disposal Works	Stalybridge, &c. Sewerage Bd.	Newton, Son, & Bayley, 17, Cooper-st. Manchester	do.
*Electric Light at Town Hall	Bermondsey Vestry	Surveyor, Town Hall. Bermondsey	do.
Additions to Workhouse, Selly Oak, nr. Birmingham	King's Norton Union	Whitwell & Son, Archt. 23, Temple-row, Birmingham	do.
Drainage Works, Downderry	St. Germans (Cornwall) R.D.C.	F. W. Cleverton, 4, Buckland-terrace, Plymouth	do.
Road Diversion and Bridges, Redcar	N.E. Ry. Co.	W. J. Cudworth, Engr. Darlington	do.
Distribution Works	Corp. of Birmingham	Jas. Mansergh, 5, Victoria-street, Westminster	Sept. 14
Steam Pumps, &c.	Leyton U.D.C.	F. H. Lewis, Engr. Cathall-rd. Leytonstone	do.
Malt Kiln, Bures St. Mary, Suffolk		G. H. Page, Archt. Trinity Chambers, Colchester	do.
Granite and Flints	Sunbury-on-Thames U.D.C.	H. F. Coales, Surv. Council Offices	do.
*Erection of Electric Light Station	Walthamstow U.D.C.	E. J. Gowen, Town Hall, Walthamstow	Sept. 15
Block of Schools	Enfield School Board	G. E. L. Laurence, 181, Queen Victoria-st. E.C.	do.
Workhouse Infirmary	Thornbury (Glos.) Union	G. H. Oatley, Archt. Baldwin st. Bristol	do.
*Repairing High-st, &c	Barnet U.D.C.	W. H. Mansbridge, 40, High-st. Barnet	Sept. 16
Sewering, Levelling, &c. Upper Newborough-st. and others	York Corp.	A. Cheer, Engr. Guildhall, York	Sept. 18
Additions to School, Tyersal	Bradford Sch. Bd.	E. P. Peterson, Archt. 48, Sunbridge-rd. Bradford	do.
Ten Dwellings, Durnsford-rd.	Wimbledon U.D.C.	C. H. Cooper, C.E. Broadway, Wimbledon	do.
*New Coastguard Buildings at Littlestones in Kent		Director of Works Dept. Admiralty, 21, Northumberland-av. W.C.	Sept. 19
Strong Room, &c. Long Melford, Suffolk		Fisher & Steed, Long Melford	Sept. 20
Building Works at Workhouse	Carne Abbas Union	A.E.A. Uble, Union Offices, Carne Abbas, Dorset	Sept. 25
Structural Alterations, Woodfield House	Paddington Gdns.	F. J. Smith, Parliament Mansions, Victoria-st. S.W.	Sept. 27
Cottage Hospital, Hallwill, Devon		C. F. A. Voysey, Archt. 6, Carlton-hill, N.W.	Sept. 30
Underground Urinal, Blackheath	L.C.C.	Archt's Dept. Spring-gardens, S.W.	Oct. 3
*Erection of Asylum at Tooting Bec Common	Metropolitan Asylums Board	A. & C. Harston, 15, Leadenhall-street, E.C.	Oct. 11

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p. —.* *Contracts, pp.* lv. vi. viii. x. & xxi. *Public Appointments, pp.* xviii. xix. & xxi.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
*Erection of Workhouse Infirmary, &c.	Wolverhampton Union	A. Marshall, King-street, Nottingham	Oct. 12
Two Houses, Sunderland-road, Gateshead	.....	B. F. Simpson, Archt. 12, Grey-st. Newcastle-on-Tyne	No date
Tramway Rails, &c. (5,000 tons)	Newcastle-on-Tyne Corp.	City Engineer, Town Hall	do.
Branch Premises	Wallsend Indus. Co-op. Soc. Ltd.	Secretary, Company's Offices, Wallsend	do.
Seventy Cottages, Shops, &c. Broad-lane, Bramley, Leeds	.....	J. P. Kay, Archt. 34, Prudential-buildings, Leeds	do.
Bridge, Longthwaite, Borrowdale	.....	T. Wren, Longthwaite, Borrowdale	do.
Two Houses, &c. Bare, Morecambe	.....	A. Anderson, Lodge-street Bare	do.
Offices, Chesterfield	Brampton Brewery Co. Ltd.	J. P. Earle, Archt. Norfolk-row, Sheffield	do.
Engine House, &c. Consett, Durham	Consett Iron Co. Ltd.	Engineer, Company's Offices, Consett	do.
Schools, Newport, Mon.	.....	F. R. Kempson, Archt. 16, High-street Cardiff	do.
Institute, School, &c. New Tupton, Derbyshire	.....	E. Oxley, Archt. Clay Cross	do.
Kiln and Malt Store, Fornham Malting, Suffolk	.....	E. Pritchett, Hardwicke Estate Office, Bury St. Edmunds	do.
Additions, &c. to Dyehouse, Mill-st. Kidderminster	E. Hughes & Son	Gething & Son, Archt. Oxford-chmbrs. Kidderminster	do.
Thirteen Houses, Ivy House Estate, York-road, Leeds	W. Byrom	J. W. Thackray, Archt. 14, Infirmary-street, Leeds	do.
Fifteen Houses, Tuxford	.....	Flockton, Gibbs, & Co. Archt. 15, St. James'-row, Sheffield	do.
Offices, &c. Globe Foundry, Bradford	.....	F. Moore, Archt. 40, Sunbridge-rd. Bradford	do.
Vicarage, Irthlington, Carlisle	.....	T. Taylor Scott, Archt. 43, Lowther-st. Carlisle	do.
Sixty Houses, Bruce Grove, Tottenham, N.	.....	R. J. Adams, Archt. 55, Leighton-road, Kentish Town, N.W.	do.
Stable, Shed, &c. Cullingworth, Yorks	Bingley U.D.C.	H. Bottomley, Surv. Town Hall, Bingley	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Two Pair Cottages, Holly Bush Hill Brickworks, Gt. Bentley, Essex	J. Girling	J. W. Start, Archt. Colchester	No date
Additions to National Schools, West Winch, Norfolk	.....	A. J. Lacey, Archt. 6, Upper King-st. Norwich	do.
Banking Premises, Stalybridge	.....	Eaton, Sons, & Co. Archts. Bank-building, Ashton-under-Lyne	do.
Cottage, Killingham, Yorks.	Miss Powell	Bland & Bown, Archt. North Park-rd. Harrogate	do.
Eight Cottages, Outwood, Leeds	.....	W. Squires, Archt. Royal Exchange-chmbrs. Boar-lane, Leeds	do.
Two Blocks of Flats, Tooting, S.W.	.....	Mr. Theobald, Archt. 26, Budge-row, Cannon-st. E.C.	do.
Parish Room and Institute, St. John's, Tunbridge Wells	.....	H. H. & R. Cronk, Archts. Tunbridge Wells	do.
Brick or Concrete Tank, Middlesbrough	.....	Sadler & Co. Chemical Works, Middlesbrough	do.
Banking Premises, Euston-road, Morecambe	Bank of Liverpool, Ltd.	Cressey & Keighley, Archts. Euston-rd. Morecambe	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
Two Building Inspectors	Halifax County Boro.	100*l.* per annum each	Sept. 4
*Chief Architectural Assistant	City of Bradford	200*l.* per annum	Sept. 9
*Assistant	do.	150*l.* per annum	do.
*Clerk of Works	do.	120*l.* per annum	do.
General Foreman	Bermondsey Vestry	3*l.* per week	Sept. 6
Sanitary Inspector	Camberwell Vestry	117*l.*	do.
*Clerk of Works	Boro of Warrington	.....	Sept. 9

Those marked with an asterisk (*) are advertised in this Number. Competitions, p. —. Contracts, pp. lv. vi. viii. x. & xxi. Public Appointments, pp. xviii. xix. & xxi.

TO CORRESPONDENTS.

J. E. (Below our limit)—J. B. (Amounts should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

ALDERSHOT.—For additions, &c., to No. 10, Station-road, for Mr. J. Lazareck. Messrs. Friend & Lloyd, architects, Aldershot :—

J. W. Gunstone.	£315 17 6	F. Knight	£267 0 0
M. Bateman ..	280 0 0	W. Garland, Aldershot* ..	249 0 0
J. Charles	275 0 0		

BANSTEAD.—For erecting water-closets and latrines at Banstead schools, for the Managers of the Kensington and Chelsea School District. Mr. Cecil A. Sharp, architect, 11, Old Queen-street, Queen Anne's Gate, Westminster, S.W. :—

T. T. Richards	£550	Akers & Co.	£405
F. L. Shopland	451	Huntley Bros.	376
Doulton & Co.	445	Smith & Son	375
E. J. Burnand	418	W. J. Wells*	368

BARROW-ON-SOAR.—For the erection of a pair of houses, for Mrs. Shaw and Mr. R. W. Johnson. Mr. Roger H. Boot, architect, Beeston, Notts. Quantities by the architect :—

F. J. Thompson* ..	£998 10	J. Freer	£995 0
J. T. Ball	995 10		

BIDDULPH.—For the execution of water supply works, for the Urban District Council. Mr. C. R. Hall, engineer, 1, West-street, Congleton. Quantities by the engineer :—

W. Lawton ..	£3,651 2 7	J. & S. Beech	£3,265 0 0
Williams & Co.	3,622 5 8	C. J. Nevitt, Stafford* ..	3,132 10 0
F. Barke	3,276 0 0	H. Shardlow	3,077 2 0
W. Lovatt	3,275 0 0		
C. W. Machin	3,298 0 0		

[Engineer's estimate, £3,221 18s. 5d.]

BOSTON (Lincs.).—For enlargements at the Kirton Holme and Church End schools, for the Kirton School Board :—

Holme School.

T. H. Cade, Boston £35

Church End Schools.

J. Langley, Kirton-in-Boston £145

BRIDLINGTON QUAY.—For the erection of three double-fronted houses, Horsforth-avenue, for Mr. F. Lowson. Mr. J. Earnshaw, architect, Carlton House, Bridlington Quay :—

E. Corner	£1,882 10 0	E. Wilson	£1,695 12 0
Blackburn & Son	1,856 0 0	Smallwood & Shaw	1,680 11 6
T. Weldon ..	1,806 16 3	E. E. Yeomans	1,505 0 0
T. Spink	1,798 0 0	W. Barnes ..	1,500 0 0
T. Atkin	1,784 10 0	T. Blackburn	1,495 0 0
A. Gardam ..	1,711 0 0	J. Rennard* ..	1,195 10 0

[All of Bridlington Quay].

BRUTON.—For erecting girls' school. Mr. A. J. Pictor, architect, Bruton :—

S. Dodimead	£3,735 0 0	Clarke & Sons	£3,210 0 0
Long & Sons	3,638 0 0	J. & L. Francis	3,200 0 0
H. W. Pollard	3,460 0 0	T. Hobbs, Bruton*	3,041 3 4
Merrick & Sons	3,250 0 0		
T. Lydford ..	3,219 0 0		

BURNTISLAND (N.B.).—For the erection of school buildings for the School Board. Mr. Robert Little, architect, 4, St. Brycedale-avenue, Kirkcaldy :—

Masonry.—J. Jackson & Son, Burntisland	£2,525 16 6
Joinery.—D. Simpson, Kirkcaldy ..	1,299 11 4
Plumbing.—A. Rolland & Son, Dumfermline	283 14 6
Slating.—J. Storrier, Newport, Fife	120 0 0
Plastering.—W. Anderson, Burntisland	165 2 0
Ironwork.—Gibson & Son, West Fountainbridge, Edinburgh	153 16 0
Heating.—Meikle & Philp, Torphichen-street, Edinburgh	225 0 0
Painting.—A. Dick, Burntisland ..	52 13 5
Total	4,825 13 9

CARDIFF.—For the erection of warehouses, Millicent-street, for Mr. J. Isaac. Mr. E. G. C. Down, architect, 31, High-street, Cardiff. Quantities by architect :—

Williams & Hoare	£1,925 0 0	F. Couzens ..	£1,848 19 10
J. Perkins	1,923 18 0	R. Haines	1,810 0 0
Blacker Bros.	1,888 0 0	Thomas & Son	1,795 0 0
Lattey & Co.	1,861 0 0	G. Griffiths ..	1,764 17 0
Thomas & Co.	1,855 7 0	Shepton & Son*	1,734 10 0
		Rees & Thomas	1,679 0 0

[All of Cardiff.]

CLAYTON-LE-MOORS.—For the execution of surface-water drainage works, for the Urban District Council. Mr. A. Dodgeon, Surveyor, Council Offices, Clayton-le-Moors. Quantities by the Surveyor :—

A. Ingham	£394 18 7	W. H. Bury	£234 12 4
W. Dean	351 18 6	Walker & Co. ..	215 17 9
E. Heap	344 14 3	T. & J. Green	184 0 8
Cunliffe & Sons	331 10 10	C. Metcalfe	182 0 3
Exors. of A. Broadley	277 11 10	W. Jenkins, Blackburn* ..	164 15 2
W. Gould	258 14 9		

[The Council provides pipes, manhole covers, lamphole covers, and flap valve.]

CREWKERNE.—For the erection of a factory at Crewkerne, for Mr. J. H. Walter. Mr. Henry Hall, architect, 19, Doughty-street, W.C. :—

Quibell	£2,083 0 0	Lye & Sons Crewkerne*	£1,773 17 6
Watts	2,078 0 0		
Munford	1,895 10 6		

CROSS KEYS (Mon.).—For the erection of a river wall, Full Moon, Cross Keys, for the Risca Urban District Council. Mr. J. William, surveyor, Risca :—

Thomas Brothers, Pontymister* £730 19 2

DALWOOD.—For erecting a residence at Dalwood, near Axminster, for Mr. J. G. White. Mr. R. M. Challice, architect :—

G. H. Lentell	£794 10	Chas. Turner, Honiton	£600
J. Bromfield	785 0		

DURHAM.—For the erection of a river wall, for the Urban District Council. Mr. W. T. Jones, architect, 7A, North Bailey, Durham :—

J. Cainch, contractor, Durham £1,625 17 6

EXETER.—For new shop-front, and alterations to 56, Fore-street, Exeter, for Mr. W. J. Villar. Mr. R. M. Challice, architect :—

Westcott, Austin, & White	£788	J. Popman	£445
L. Smale	475	Shepherd Bros., Sidwell-street, Exeter*	370

EXETER.—For new shop-front, and alterations to 197, High-street, Exeter, for Mr. J. Tulsford. Mr. R. M. Challice, architect :—

J. Balsom	£1,068	Westcott, Austin, & White, Exeter*	£940
Stephens & Son, Ltd.	1,033	J. T. Ayres	740
L. Smale	1,033		
Ham & Passmore ..	1,025		

FEATHERSTONE (Yorks).—For the erection of two villas, for Mr. John Shaw. Messrs. Garside & Pennington, architects, Pontefract :—

Walker & Ward, Mill Hill, Pontefract* £500

GLASGOW.—For the construction of new streets and sewers, Battlefield district, Langside, for the proprietors of Langside Estate. Mr. John Cowan, C.E., 179, West George-street, Glasgow :—

George Duncan, Newlands, Glasgow* .. £2,689 14

HALE (Cheshire).—For levelling, metalling, &c., Lisson-grove, for the Bucklow Rural District Council. Mr. J. McD. McKenzie, surveyor, 7, Market-street, Altrincham :—

Wm. Barton, Hale* £177

LEEDS.—For the erection of stables, coach-house, &c., Cavendish House, for Dr. S. Rumboll. Mr. Fred. Mitchell, architect, 3, Upper Fountaine-street, Leeds :—

Brick and Stone.—J. Pickard, Dorrington-street, Leeds* ..
Joinery.—T. Harrod, Craven-road, Leeds*
Plumbing.—J. E. Bedford, Chapel Allerton, Leeds*
Slating.—Watson & Worsnop, Whitehall-road, Leeds*
Painting.—Walsh & Sons, Wade-lane, Leeds* } £634
Patent Glazing.—Heywood & Co., Bay Hall Works, Huddersfield*
Stable Fittings.—Green & Son, Smithfield Works, Leeds*
Revolving Shutters.—W. F. S. Holt, Bowling Back-lane, Bradford*

[*See also next page.*

LEEDS.—For alterations to offices, Pease's-buildings, for the Board of Overseers. Messrs. Bedford & Kitson, architects, Greek-street-chambers, Leeds. Quantities by the architects :—

Isaac Gould	£3,850 0 0	J. T. Wright	£3,650 0 0
Irwin & Co.	3,833 0 0	Wood & Son	3,699 0 0
Armitage & Hodgson	3,740 0 0	Myers & Son, Woodhouse-st., Leeds*	3,499 0 0
Nicholson & Sons	3,725 10 11		

LEEDS.—For levelling, metalling, &c., part of Old Park-road, Roundhay. Mr. E. J. Silcock, C.E., 10, Park-row, Leeds :—

J. Simpson	£3,562	Speight & Sons	£3,275
J. Ellis	3,511	J. Speight*	3,159

[All of Leeds.]

LONDON.—For the erection of two dwelling houses and shops, Langhedge-road, Tottenham, N., for Messrs. Holt & Co. Mr. Fred. A. Ashton, architect, 177, Romford-road, Stratford, E. :—

J. & H. Cocks, Ltd.	£1,949	C. Chapman	£1,699

LONDON.—For pulling down and rebuilding premises, No. 97, Bishopsgate-street Without, E.C. Messrs. Dale & Gadsdon, architects, 8, Union-court, Old Broad-street, E.C. :—

Gladding	£1,280	Sharpe & Sons*	£1,153
Symes	1,260	Pearman	1,055
Hoare & Sons	1,222		

LONDON.—For the erection of shops and offices, Bishopsgate, E.C. Messrs. Dale & Gadsdon, architects, 8, Union-court, Old Broad-street, E.C. :—

Symes	£4,740	Sharpe & Sons	£4,590
Adamson & Sons	4,710	Williams	4,587
Hoare & Sons	4,670	Perry Bros.	4,557
Gladding	4,650		

LONDON.—For the superstructure of a new building in Throgmorton-street, City, to be used as a restaurant, shops, and offices, for Messrs. J. Lyons & Company, Limited. Mr. Charles Reilly, architect, 23, St. Swithin's-lane, E.C. Quantities by Messrs. Gardiner & Theobald, 110, Great Russell-street, W.C. :—

Hall, Beddall, & Co.	£43,900	Holland & Hannen	£41,950
Ashby & Horner	43,547	Mowlem & Co.	41,760
Trollope & Sons	42,666	Colls & Son	40,720
Foster & Dicksee	42,500	Patrick & Son	34,639

LONDONDERRY.—For the erection of parochial house, Tullygoan, Feeny. Mr. J. P. M'Grath, architect, 28, Carlisle-road, Londonderry. Quantities by Mr. John Ferguson, London-street, Derry :—

Daniel McCaffrey	£892 6	Humprey Campbell.	£730 0
Gallagher & Co.	822 0	James Deeney, Dungiven*	625 0
Daniel Gillespie	780 0		

MIDDLETON (Lancs.).—For the erection of chapel and schools, for the Wesleyan Chapel Trustees. Mr. Edgar Wood, architect, 78, Cross-street, Manchester :—

Bridge	£7,800	Grundy	£7,440
Robertson	7,697	Bullivant	6,889
Alderson	7,636	Jackson	6,850
R. Partington	7,594	J. Partington	6,800
Holland	7,536	Cable, Middleton*	6,645
Simpson	7,476		

SENGHENITH (Wales).—For the erection of business premises, Commercial-square, for Messrs. Jones & Morgan. Mr. E. H. Bruton, architect, 15, Queen-street, Cardiff. Quantities by architect :—

Shops for Mr. Jenkin Jones.

Thomas & Co.	£3,232 0 0	J. Lewis	£2,750
T. Evans	2,844 7 11	W. Ingleson	2,695
D. Thomas	2,836 0 0	J. Bowen	2,663

Additions to Hotel, Mr. Josiah Morgan.

J. Lewis	£1,245	D. Thomas	£974
T. Evans	986	W. Ingleson	843
Thomas & Co.	982	J. Bowen	779

STAMFORD.—For erecting new workhouse, for the Stamford Union. Mr. J. H. Morton, architect, South Shields :—

J. W. Rowe	£28,515	Lewin & Son	£23,995
Hockley & Son	26,710	Hinson Bros.	23,694
Bowman & Sons	25,687	Arnold & Son	23,330
Johnson & Son	25,548	Walker & Slater, Derby*	23,150
S. F. Halliday	24,644		

STOKESLEY.—For the erection of a stone bridge, for the Rural District Council. Mr. W. H. Dixon, surveyor, Kirkby-in-Cleveland :—

Atkinson & Son.	£696 8 6	J. Bainbridge, Gt. Broughton*	£650 0 0
A. Bainbridge	694 7 0		

* Accepted, but contract thrown up.

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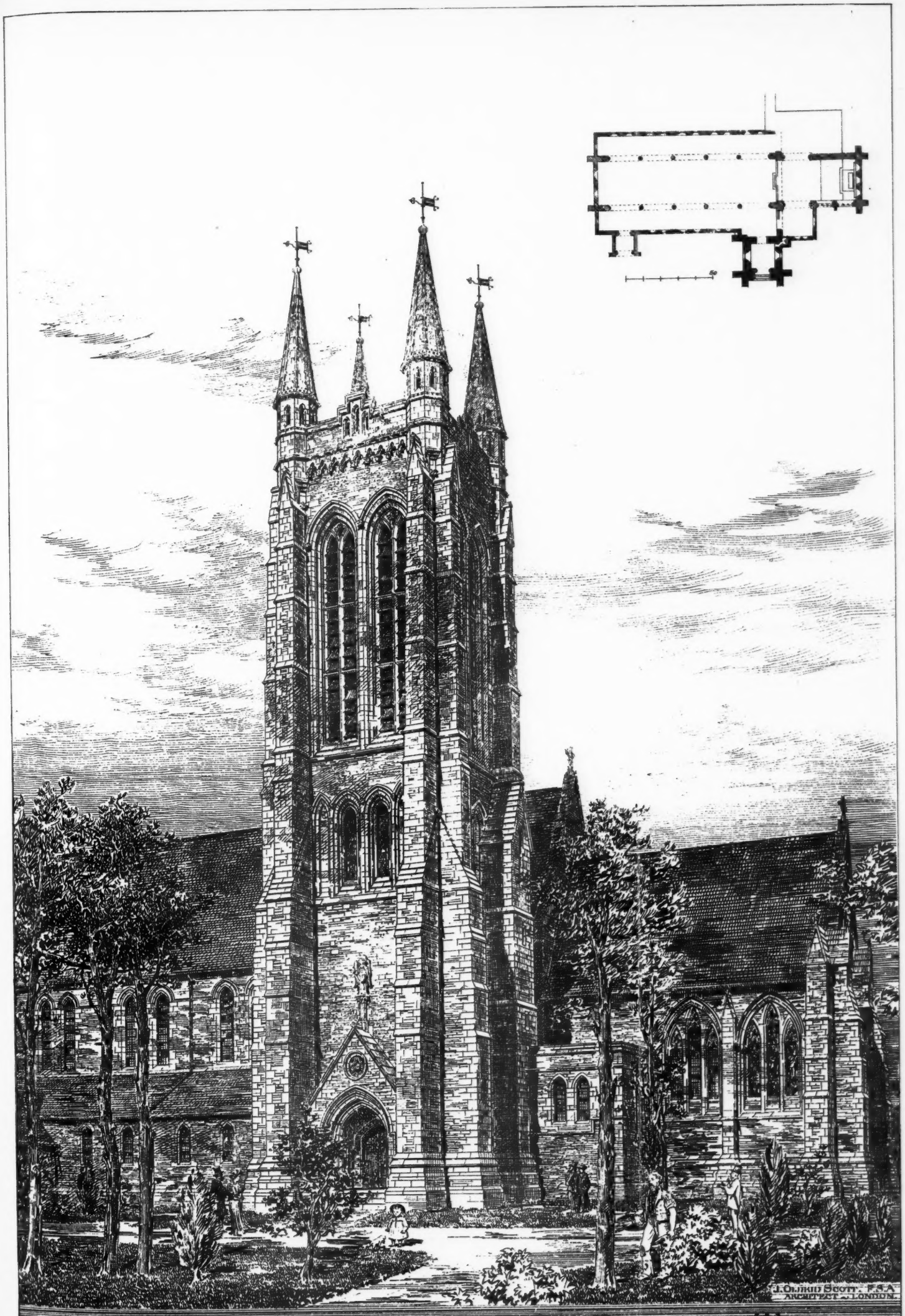

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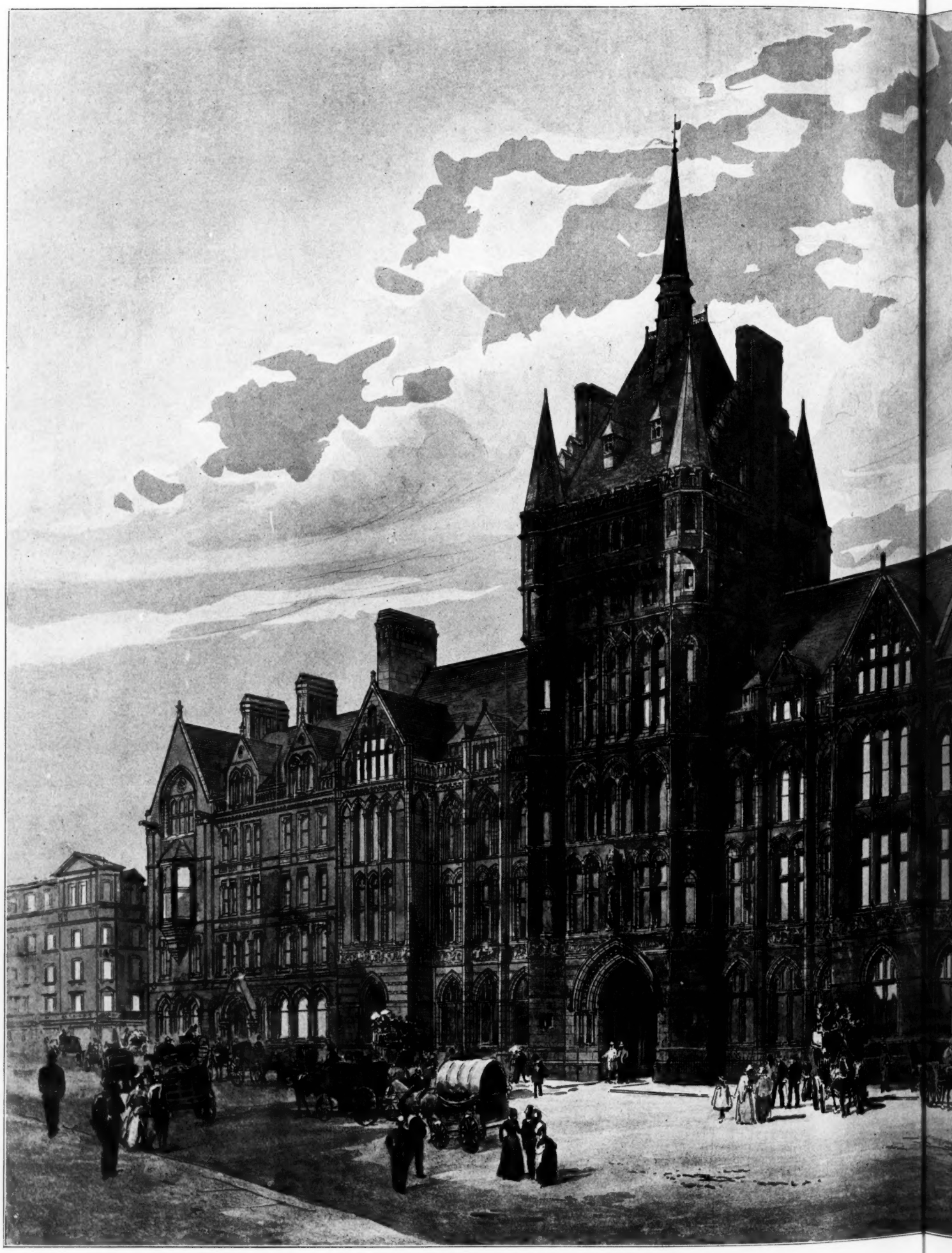

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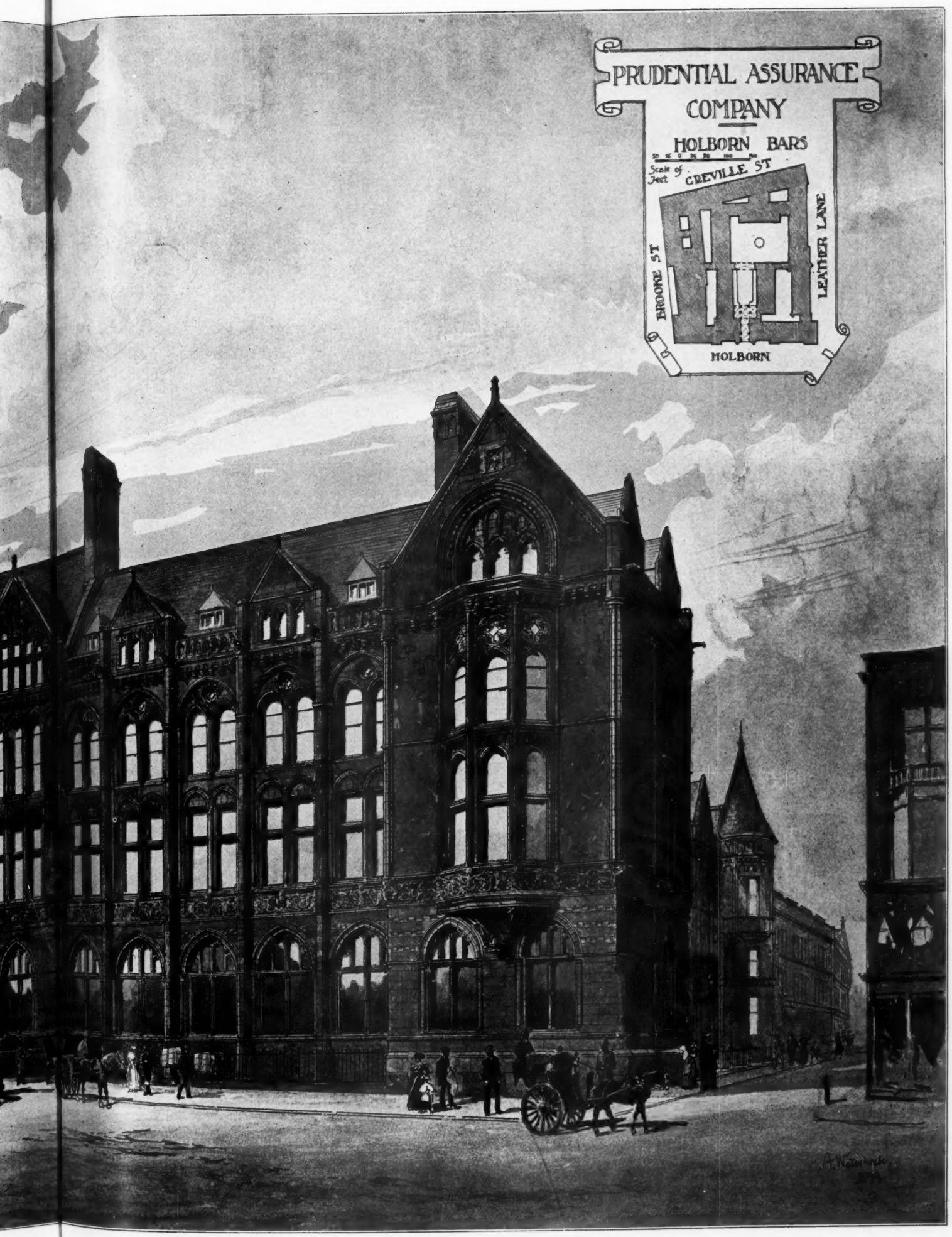

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